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ABSTRACT

In response to a legislative directive, a study was conducted of dental education in Florida, the report of which constitutes part of the Comprehensive Health Professions Education Plan for the state. The study encompassed dental, dental hygiene and dental assisting education, with information provided on professional and educational aspects of the fields and particular attention given to manpower supply and demand issues. Twenty-two recommendations resulting from the study (relating to manpower, curricula, licensure, articulation and minority participation) have been endorsed. A major conclusion of the study is that no enrollment expansion is currently warranted in the state's dental education program (at the University of Florida), given favorable supply and demand projections for the state. The study is reported as follows: (1) executive summary (including the background of the study and the 22 recommendations); (2) dental education; (3) dental hygiene; (4) dental assisting; and (5) issues and recommendations (dental manpower, curricula, licensure and certification, articulation, and minority participation). For each of the three areas of dentistry, the profession, licensure, employment sites, education and manpower are discussed, including enrollments and manpower projections. Appendices list the accredited and state-approved dental hygiene programs in Florida; institutions accredited to teach dental assisting; and institutions approved to offer expanded functions and radiography course. A sries of 28 tables and five figures provide the data and projections developed by the study. (KM)

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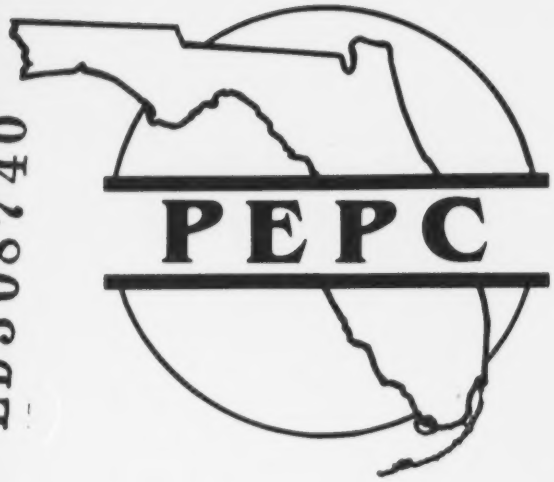

DENTAL EDUCATION IN FLORIDA

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Report and Recommendations of the Postsecondary Education Planning Commission

1989 - REPORT 3

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The Postsecondary Education Planning Commission, initially created by executive order in 1980 and subsequently given statutory authority, serves as an advisory body to the State Board of Education on all postsecondary education matters. The Commission is composed of 11 members of the general public and one full-time student registered at a postsecondary education institution in Florida. Members are appointed by the Governor with the approval of three members of the State Board of Education and subject to confirmation by the Senate.

The major responsibility of the Commission is preparing and updating every five years a master plan for postsecondary education. The enabling legislation directed that the Plan "shall include consideration of the promotion of quality, fundamental educational goals, programmatic access, needs for remedial education, regional and state economic development, demographic patterns, student demand for programs, needs of particular subgroups of the population, implementation of innovative educational techniques and technology, and the requirements of the labor market. The capacity of existing programs, in both public and independent institutions, to respond to identified needs shall be evaluated and a plan shall be developed to respond efficiently to unmet needs."

Other responsibilities include recommending to the State Board of Education program contracts with independent institutions; advising the State Board regarding the need for and location of new programs and branch campuses of public postsecondary education institutions; reviewing public postsecondary education budget requests for compliance with the State Master Plan; recommending to the Commissioner of Education proposals for support through the Postsecondary Cooperation Trust Fund; and periodically evaluating the State's 28 regional coordinating councils for vocational education, adult general education and community instructional services.

Further information about the Commission, its publications, meetings and other activities may be obtained from the Commission office, 304 Knott Building, Department of Education, Tallahassee, Florida, 32301; telephone (904) 488-7894.

POSTSECONDARY EDUCATION PLANNING COMMISSION

DENTAL EDUCATION IN FLORIDA

Prepared in Response to
Specific Appropriation 526
of the
1988 General Appropriations Act
(Chapter 88-555, Laws of Florida)

1989 - Report 3

February 16, 1989

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EXECUTIVE SUMMARY

The Legislature, through proviso to Specific Appropriation 526 of the 1988 General Appropriations Act, directed the Postsecondary Education Planning Commission to conduct a study of dental education in the State. This study is one of a series of reports which comprise the Comprehensive Health Professions Education Plan for Florida. The study encompassed dental, dental hygiene, and dental assisting education, with information provided on professional and educational aspects of dentists and dental auxiliaries both statewide and nationally. While particular attention was given to manpower supply of and demand for dentists, hygienists, and assistants, other issues were identified and recommendations made to address them. Examination of dental hygiene and dental assisting education was facilitated by a concurrent joint review of these programs by the State Board of Community Colleges and the Division of Vocational, Adult and Community Education.

The College of Dentistry at the University of Florida, one of 59 accredited dental schools in the nation, offers the only dental program in the State. A four-year professional program culminating in a doctoral degree in dental surgery or in dental medicine may be followed by specialty training requiring two to three years of postdoctoral study. Approximately 75 new students are admitted annually to the dental program, with between 65 and 70 degrees awarded annually in recent years. Declining dental program enrollments nationally have focused attention on manpower supply, and revised manpower projections suggest that by the next century the nation will not experience the oversupply of dentists that had been predicted earlier in this decade. Given favorable supply and demand projections for Florida, however, the study concluded that no enrollment expansion is currently warranted in the University of Florida program.

The education of dental hygienists in Florida is provided through associate degree programs at nine public community colleges. Upon graduation from an AS degree program and successful completion of the National Board of Dental Hygiene examination, students may sit for the Florida licensure examination. Dental hygiene education issues that emerged during the course of the study were related to manpower, curricula, licensure, and minority participation. The Commission examined information on reported shortages of dental hygienists and developed recommendations to explore alternatives to increase enrollments in existing programs rather than establish new programs. The Commission endorsed the present dental hygiene curricula but called upon the State Board of Community Colleges to review curricular length in its program review process. In light of the apparent shortages in dental hygienists, the study recommended that temporary permitting of out-of-state hygienists be instituted by the Board of Dentistry. Finally, after reviewing the issue of gender and racial/ethnic minority participation in dental hygiene programs, the Commission recommended that educators and professional associations establish minority recruitment as a priority concern and develop strategies to increase enrollments, graduations, and licensure examination performance among underrepresented groups.

Dental assistants form a second group of ancillary personnel trained to assist the dentist in the delivery of oral healtn care. The number of practicing dental assistants in Florida is unknown due to the various modes of employment

entry. Formal training is available through programs at the adult vocational education level in public community colleges and vocational/technical centers as well as in independent institutions and proprietary schools. Formal educational programs normally lead to a certificate award following approximately one year of full-time study. In addition, an unknown number of individuals enter the occupation through on-the-job training. Unlike dental hygienists, there is no State licensure, certification, or registration of all dental assistants. The State regulates only those assistants who perform expanded duties and radiography. Consequently, issues such as manpower, regulation, minority participation, and articulation developed as major concerns during the study. Although the data were limited on dental assisting manpower supply and demand, the Commission concluded that there was no need to expand existing or establish new educational programs of a similar nature. After examining the issue of curricula, the study endorsed the leveling of assisting programs to the certificate award rather than the associate degree and called upon the Board of Dentistry to develop criteria to approve both formal educational and on-the-job dental assisting programs. On the issue of regulation, the Commission recommended certification of dental assistants performing expanded duties and radiography through a statewide standardized examination in each of these two areas. In a separate issue, enhancing articulation between dental assisting programs and associate degree dental hygiene programs was recognized as an area that should be addressed by the Articulation Coordinating Committee in the Department of Education.

The Commission endorsed the following specific recommendations based upon the findings of the dental education study.

Recommendations:

1. **The size of the first-year class at the University of Florida College of Dentistry should remain at its present level. Data analyzed in the preparation of this study suggest that at this level the State will continue to have a sufficient number of dentists to serve the dental needs of its residents.**

2. **The Florida Dental Association and local dental societies should involve representatives of the College of Dentistry in SELECT a program developed by the American Dental Association to promote careers in dentistry and related fields.**

3. **In light of the dynamic variables influencing both supply and demand of dentists, the Office of Comprehensive Health Planning in the Department of Health and Rehabilitative Services should examine dental manpower in 1991 and provide updated estimates on the supply of and demand for dentists in the State by 1993.**

4. **Dental hygiene programs should provide for flexible programming and consider such alternative approaches as expanded scheduling, off-campus programs, and cooperative programs with other community colleges.**

5. **The establishment of new dental hygiene programs to increase the number of practicing dental hygienists in shortage areas should be considered only after careful review and clear**

demonstration of need. High program expenses compromise other institutional priorities and lack of reliable student demand data jeopardize the future of programs implemented without very careful, thorough prior consideration.

6. Local dental societies should collaborate with dental hygiene programs, particularly those with available program space for students, in developing strategies which will encourage and support students from dental hygiene shortage areas to pursue dental hygiene education in other areas of the State and then return to their home area to practice.

7. The Florida Dental Association should coordinate with the Florida Dental Hygienists' Association and dental hygiene program directors to implement SELECT activities designed to attract both traditional and nontraditional students to dental hygiene programs.

8. In addition to initiatives at the local level, the Florida Dental Association and the Florida Dental Hygienists' Association should provide financial assistance in the form of grants, loans, and scholarships to assist students through dental hygiene education.

9. The Office of Comprehensive Health Planning in the Department of Health and Rehabilitative Services should survey dental hygienists during the 1989 licensure renewal period. In addition to demographic and practice data, information should be collected on job satisfaction and educational plans. The Florida Dental Hygienists' Association and the Florida Dental Association should be consulted in the preparation of the questionnaire instrument.

10. Information from community college follow-up studies of dental hygiene program graduates should be made available to interested State agencies as part of data gathering on dental hygiene personnel.

11. The current number of formal, one-year dental assisting programs appears to be sufficient to meet the needs of the State for these dental personnel.

12. The State Board of Community Colleges should address curricular length as an issue in its statewide review of dental hygiene programs.

13. Since dental hygiene study culminates in an associate of science degree award, these programs should continue to meet general education requirements for an associate degree.

14. The Board of Dentistry should develop criteria to approve both on-the-job training and formal dental assisting programs. Compliance with these criteria should be required by the Board of Dentistry for approval of all dental assisting programs.

15. Consistent with Section 240.355, Florida Statutes, dental assisting programs should be offered at the lowest level possible commensurate with sound professional practice. The Department of Education Core Committee for Program Leveling has determined that dental assisting programs should be offered at the postsecondary vocational education level with a certificate award.

16. The Department of Professional Regulation and the Board of Dentistry should provide temporary permitting for a maximum period of thirteen months for dental hygienists holding valid licenses from other states.

17. Dental assistants who practice expanded duties should be certified by the Board of Dentistry. In order to promote standardization and quality, certification requirements should include successful completion of a statewide standardized expanded duties examination approved by the Board of Dentistry.

18. Dental assistants who practice dental radiography should be certified by the Board of Dentistry. Certification requirements should include successful completion of a statewide standardized dental radiography examination approved by the Board of Dentistry.

19. The Articulation Coordinating Committee within the Department of Education should develop guidelines for articulation between dental assisting programs and associate degree dental hygiene programs.

20. The College of Dentistry at the University of Florida should focus recruitment efforts on increasing the representation of blacks in the entering classes. If possible, SELECT activities should be coordinated to target black youth.

21. The Florida Dental Association, local dental societies, and dental hygiene program directors should establish minority recruitment as a priority concern and coordinate their efforts to achieve the greatest impact. Specific strategies should be developed to increase enrollments, graduations, and licensure examination pass rates of gender and racial/ethnic minorities in dental hygiene.

22. Working together, dental hygiene and dental assisting programs should increase efforts to enhance the articulation opportunities of gender and racial/ethnic minorities.

I. INTRODUCTION

The Legislature, through proviso to Specific Appropriation 526 of the 1988 General Appropriations Act, directed the Postsecondary Education Planning Commission to conduct a study of dental education in the State. This study is one of a series of reports which comprise the Comprehensive Health Professions Education Plan for Florida.

Planning Committee members appointed by the Commission Chairman to conduct the study of Dental Education in Florida were Dr. Alan Fickett, Chairman, Mrs. Veda L. Dopson, Dr. Ralph Hogges, Mr. Harry L. Smith, and Ms. Tance Roberts. Committee meetings and public hearings were held in Orlando, Tallahassee, Tampa, and Fort Lauderdale between September 1988 and January 1989 to review study draft materials and to receive public testimony. Numerous groups from throughout the State contributed to the study; these included representatives of dental, dental hygiene, and dental assisting programs, the Board of Regents, State Board of Community Colleges, Division of Vocational, Adult and Community Education, Board of Dentistry, Department of Professional Regulation, Department of Health and Rehabilitative Services, professional associations, and practitioners. Information was collected and reviewed relative to national and State dental education as well as the dental professions. Interested parties statewide had opportunities to respond to draft materials as the documents were widely circulated throughout the study process.

At the request of the 1982 Legislature, the Commission developed an outline of a comprehensive health professions education plan for Florida. This study, titled Health Professions Report, recommended that individual examinations of major health professions education areas be undertaken over a series of years. Consequently, the present study of dental education has been preceded by two related Commission reports that will serve as reference points.

During the period between 1983 and 1987, the Commission studied eight health professions. A report on Dental Education completed in 1984 examined such issues as manpower, access, foreign graduates, and serving the elderly. The report concluded that the supply of dentists in the State was adequate to meet the demands of the population.

The 1984 Dental Education study also reviewed the education of ancillary personnel in Florida for this profession and recommended no expansion in the number of dental hygiene, assisting, or laboratory technology programs. Additionally, the Commission proposed revising the minimum placement standard for public vocational programs from 60 percent to 75 percent during the second five-year cycle of program reviews. Other recommendations were made on the need to review the practice of awarding Associate of Science degrees to students in dental assisting and dental laboratory technology programs and to examine the disparity in the number of credit hours required for graduation from dental hygiene programs. Another important issue of concern to the Commission was institutional licensure pass rates on the dental hygiene examination; a recommendation was made to develop standards for licensure passing.

Upon completion of studies for each of the eight major health professions, the 1987 Legislature requested that the status of these health professions education programs be updated. The report, Comprehensive Health Professions Plan Review for Florida (1988), briefly examined dental education through a review of manpower supply and demand programs and a review of past recommendations. This update found that increasing demand for dental service may begin to exceed supply by the end of this century. The report also reaffirmed the need to develop new approaches to meet the needs of underserved rural and inner city areas. In addition, the study reported on enhancement of the research component at the University of Florida's College of Dentistry and increased attention to the dental needs of the elderly. Regarding dental hygiene education, the Commission noted renewed interest in establishing dental hygiene programs in underserved areas of the state.

II. DENTAL EDUCATION

A. The Profession

The U.S. Department of Health and Human Services reports that approximately 143,000 dentists were practicing in the U.S. in 1986, the majority of whom, about 137,900, were civilian dentists. Most dentists engage in private practice as general practitioners or specialists. The American Dental Association suggests that the typical dentist is involved in some aspect of prevention/public education, detection of diseases, aesthetic improvement, restoration, correction, reconstruction, or surgery.

A periodic survey conducted by the American Dental Association provides descriptive statistics on the general characteristics of private practitioners in the United States. Data from the most recent survey (1986), indicates that 18.7 percent of all private practitioners are under the age of 35, and approximately half (52.1%) are under the age of 45. About eight percent are 65 years of age or older. Of the nine U.S. regions, the South Atlantic area, which includes Florida, exhibits a higher concentration of private practitioners with 17.8, percent than all regions with the exception of the Middle Atlantic area with 17.9 percent. The lowest concentration of practitioners is in the West North Central area with 5.1 percent. Private practitioners spend, on average, 42.5 hours per week in the practice. About 77 percent of this time is spent treating patients.

Among active practicing dentists, approximately 15 percent are specialists. Specializations usually require one to four years of additional training beyond the dental degree and practical experience in the specialty. The American Dental Association presently recognizes eight dental specialties:

- Dental Public Health
- Endodontics
- Oral Pathology
- Oral Surgery
- Orthodontics
- Pediatric Dentistry
- Periodontics
- Prosthodontics

The number of dental specialists more than doubled between 1970 and 1986 while the growth in general practitioners was 31 percent during the same period. Orthodontists and maxillofacial surgeons comprise 56 percent of all dental specialists.

A 1986 survey of Florida dentists conducted by the Department of Health and Rehabilitative Services (HRS) found that most of the State's licensed dentists actively practice in Florida. Among the licensed dentists responding, 80.8 percent listed Florida as the primary state of practice, 2.1 percent were inactive, and the remainder listed another state as the primary practice site. Among the demographic characteristics, 95 percent of Florida dentists are male. By race/ethnicity, 91 percent are white, 8.2 percent are black, and 3.8 percent are Hispanic. Approximately 50 percent of the respondents indicated they were under the age of 45 and 8.6 percent were 65 or older.

Approximately 16 percent of the respondents reported receiving their degree from a Georgia institution while 9.2 percent indicated a Florida institution. The report pointed out that Florida tends to attract dentists from other southern states as more than 45 percent of the dentists in Florida received their degree from a southeastern school. The distribution of Florida dentists between generalists and specialists differs slightly from national statistics, with 79.8 percent of those responding to the survey indicating general practice and 18.9 percent listing a specialization area. Only 1.3 percent of the dentists responding were in public health.

B. Licensure

Licensure is required under statute to practice dentistry in Florida. Individuals seeking licensure must apply to the Department of Professional Regulation and may take the examinations required if they have graduated from a dental school accredited by the Commission on Accreditation of the American Dental Association (ADA) or any other nationally recognized accrediting agency and have successfully completed the National Board of Dental Examiners' dental examination within 10 years of the date of application (466.006(2), Florida Statutes). Graduates of dental programs not accredited by the ADA as well as graduates of the University of Havana before 1962 have separate requirements.

The Florida dental examination consists of a written examination on the laws and rules of the State regulating the practice of dentistry, a practical or clinical examination, and an oral diagnostic skills examination. Skills tested in the clinical examination are specified in statute. Applicants who fail the clinical examination in three attempts must complete additional educational requirements established by the Board of Dentistry before gaining eligibility for reexamination. Both written and clinical examinations are usually offered twice annually, in June and December, while the written examination alone is offered in March and September.

Data on examination results from 1985 to 1987 are illustrated in Table 1. The largest number of examinees sit for the June and December tests; far fewer take the written examination alone in March or September. The total number of candidates sitting for the June/December examinations decreased steadily between 1985 and 1987, with 668 examinees in 1985, 589 in 1986, and 532 in 1987. The pass rates from the June/December examinations tended to average about 60 percent with the exception of the June 1986 administration when only 42.2 percent successfully passed. The pass rates reflect an overall percentage which includes results on the written, clinical, and diagnostic skills areas.

The distribution of examinees by gender and race/ethnicity reveals few trends (Table 2). Although males have consistently accounted for close to 80 percent of all examinees, female representation has increased from 17.6 percent in 1985 to 22.2 percent in December 1987. This trend is consonant with national data on the increasing participation of women in the dental profession. Blacks averaged about three percent of all enrollees in the June/December administrations, but have ranged from 1.9 percent to 4.6 percent. Hispanic participation fluctuated greatly during the 1985 to 1987 period, moving from a low of 1.9 percent of all enrollees in June 1987 to a high of 14.5 percent in December 1987. In comparison with their representation in the general

population of the State, both racial/ethnic groups have generally been underrepresented in the dental examinations.

The pass rates by race/ethnicity on June/December test administrations also reveals substantial fluctuations (Table 3). The overall pass rates of whites generally slightly surpassed the pass rates for all examinees. Except for the June 1986 examination, between 60 and 68 percent of all whites taking the examination have passed. In comparison, pass rates for both blacks and Hispanics have varied greatly, although direct comparison with white percentages is difficult given the great disparity in the numbers of examinees within groups. The numbers of blacks successfully completing the examination

TABLE 1

RESULTS OF FLORIDA
BOARD OF DENTISTRY EXAMINATIONS
1985 THROUGH 1987

Date	Total	Pass		Fail	
		Number	Percent	Number	Percent
December 1987	207	126	60.9	81	39.1
September 1987	13	13	100.0	0	0.0
June 1987	325	194	59.7	131	40.3
April 1987	16	14	87.5	2	12.5
January 1987	269	170	63.2	99	36.8
September 1986	12	12	100.0	0	0.0
June 1986	320	135	42.2	185	57.8
March 1986	13	11	84.6	2	15.4
December 1985	259	160	61.8	99	38.2
September 1985	9	9	100.0	0	0.0
June 1985	409	258	63.1	151	36.9
March 1985	6	4	66.7	2	33.3

SOURCE: Florida Department of Professional Regulation, 1988.

TABLE 2

PARTICIPATION OF RACIAL/ETHNIC MINORITIES
IN FLORIDA DENTAL EXAMINATIONS
1985 TO 1987

Year	Total	MALE		FEMALE		WHITE		BLACK		HISPANIC		OTHER	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Dec 1987	207	161	77.8	46	22.2	151	72.3	7	3.4	30	14.5	19	9.2
June 1987	325	259	79.7	66	20.3	293	90.2	10	3.1	6	1.9	16	4.9
Jan 1987	269	216	80.3	53	19.7	217	80.7	5	1.9	14	5.2	33	12.3
June 1986	320	255	80.0	64	20.0	232	72.5	8	2.5	11	3.4	69	21.6
Dec 1985	259	212	81.9	27	18.1	194	74.9	12	4.6	23	8.9	30	11.6
June 1985	409	337	82.4	72	17.6	338	82.6	15	3.7	23	5.6	33	8.1

SOURCE: Florida Department of Professional Regulation, 1988.

TABLE 3

PASS RATES ON THE FLORIDA DENTAL
EXAMINATION BY RACE/ETHNICITY
1985 THROUGH 1987

Year	Total	WHITE				BLACK				HISPANIC			
		Pass		Fail		Pass		Fail		Pass		Fail	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Dec 1987	207	101	66.9	50	33.1	2	28.6	5	71.4	13	43.3	17	56.7
June 1987	325	176	60.1	117	39.9	6	60.0	4	40.0	4	66.7	2	33.3
Jan 1987	269	147	67.7	70	32.3	3	60.0	2	40.0	2	40.0	3	60.0
June 1986	320	107	46.1	125	53.9	2	25.0	6	75.0	6	35.3	11	64.7
Dec 1985	259	127	65.5	67	34.5	6	50.0	6	50.0	11	47.8	12	52.2
June 1985	409	227	67.2	111	32.8	6	40.0	9	60.0	13	56.5	10	43.5

SOURCE: Florida Department of Professional Regulation, 1988.

in the June/December tests were 8 in 1987, 5 in 1986, and 12 in 1987. Hispanic numbers have also fluctuated, with 17 passing in 1987, 8 in 1986, and 23 in 1985.

The Department of Professional Regulation reports that the number of licenses granted to dentists annually corresponds to the number of examinees who pass the State licensure examination. On this basis, from 1985 to 1987, the number of licenses granted yearly was 347, 328, and 431, with an average of 369 licenses awarded annually for the period.

In addition to licensure requirements, Florida law also mandates a minimum of 30 hours of continuing professional education in dental subjects completed biennially as a requirement for licensure renewal. Among groups authorized to provide continuing education opportunities are the American Dental Association, the National Dental Association (NDA), state, district, or local dental associations and societies affiliated with the ADA or the NDA, specialty organizations affiliated with the ADA, dental colleges accredited as providers, and other organizations, schools, or agencies approved by the Board of Dentistry. Among dentists responding to a 1986 Department of Health and Rehabilitative Services survey, 92 percent felt they had adequate access to continuing education in their specialty.

C. Employment Sites

Dentists establish their own private practices, are employed by other dentists, public or private agencies or institutions, or the armed forces. While active practice dentists may be employed in a variety of settings, the overwhelming majority, 88 percent nationally, are in private practice (Table 4). Of the remainder, 3.5 percent are in the armed forces, 2.6 percent are faculty of dental schools, and nearly two percent are in advanced training as interns or residents.

A recent report by the U.S. Department of Health and Human Services provides information on incomes of dentists. Data collected show that mean net income varies by type of practice as well as by age. Between 1983 and 1985, the mean net income nationally of general practitioners increased 13 percent, from $56,750 to $64,130 while the income of specialists increased 19.6 percent from $86,420 to $103,390. General practitioners under 30 years of age average $40,190 compared to $78,270 averaged by those between 45 and 49 years of age. The practice expenses for general practitioners in 1985 were 65.8 percent of the gross and that of specialists were 60.7 percent. The report also indicates that between 1983 and 1985 the consumer price index rose 8.0 percent while the cost of dental services rose 14.9 percent.

TABLE 4

PRIMARY TYPE OF DENTAL EMPLOYMENT OF ACTIVE
U.S. DENTISTS BY GENDER
DECEMBER 31, 1986

Primary Type of Dental Employment	ALL ACTIVE DENTISTS		MALE		FEMALE	
	Number	Percent Distribution	Number	Percent Distribution	Number	Percent Distribution
All Active	143,000	100.0	134,000	100.0	9,000	100.0
Practicing Dentist (30 or more hours per week)	110,380	77.2	105,320	78.6	5,060	56.2
Practicing Dentist (Less than 30 hours per week)	15,750	11.0	14,170	10.6	1,580	17.5
On Faculty or Staff of Dental School	3,710	2.6	3,250	2.4	460	5.1
Armed Forces Dentist	5,100	3.5	4,700	3.5	400	4.4
Other Federal Dentist	2,000	1.4	1,760	1.3	240	2.7
Dentist in State or local government	1,300	0.9	1,110	0.8	190	2.1
Hospital Staff Dentist	530	0.4	450	0.4	80	0.9
Intern or Resident	2,680	1.9	1,990	1.5	690	7.7
Other Student	710	0.5	560	0.5	150	1.7
Staff Member of Health or Dental Organization	840	0.6	690	0.5	150	1.7

SOURCE: U.S. Department of Health and Human Services, 1988.

D. Education

The American Dental Association lists 59 accredited dental schools as of June 1988 (Table 5). Among these, Emory University and Georgetown University Schools of Dentistry have discontinued their pre-doctoral programs and are no longer accepting entering classes. At least sixteen schools, or 27 percent, are located in southern states.

TABLE 5

DESCRIPTION OF U.S. DENTAL SCHOOLS
1987-88

Dental School	Total Length of Program (wks.)	Type of Degree Granted	Type of Institutional Support
University of Alabama	152	D.M.D.	Public
University of the Pacific	132	D.D.S.	Private
University of California, San Francisco	144	D.D.S.	Public
University of California, Los Angeles	154	D.D.S.	Public
University of Southern California	165	D.D.S.	Private
Loma Linda University	162	D.D.S.	Private
University of Colorado	187	D.D.S.	Public
University of Connecticut	168	D.M.D.	Public
Georgetown University[1]	152	D.D.S.	Private
Howard University	158	D.D.S.	Private
University of Florida	178	D.M.D.	Public
Emory University[1]	42	D.D.S.	Private
Medical College of Georgia	160	D.M.D.	Public
Loyola University	154	D.D.S.	Private-State Related
Northwestern University	154	D.D.S.	Private-State Related
Southern Illinois University	160	D.M.D.	Public
University of Illinois	144	D.D.S.	Public
Indiana University	163	D.D.S.	Public
University of Iowa	150	D.D.S.	Public
University of Kentucky	163	D.M.D.	Public
University of Louisville	160	D.M.D.	Public
Louisiana State University	165	D.D.S.	Public
University of Maryland	154	D.D.S.	Public
Harvard University	217	D.M.D.	Private
Boston University	155	D.M.D.	Private
Tufts University	162	D.M.D.	Private
University of Detroit	166	D.D.S.	Private-State Related
University of Michigan	140	D.D.S.	Public
University of Minnesota	150	D.D.S.	Public
University of Mississippi	157	D.M.D.	Public
University of Missouri, Kansas City	150	D.D.S.	Public
Washington University, St. Louis	168	D.M.D.	Private

Continued...

TABLE 5
(Continued)

DESCRIPTION OF U.S. DENTAL SCHOOLS
1987-88

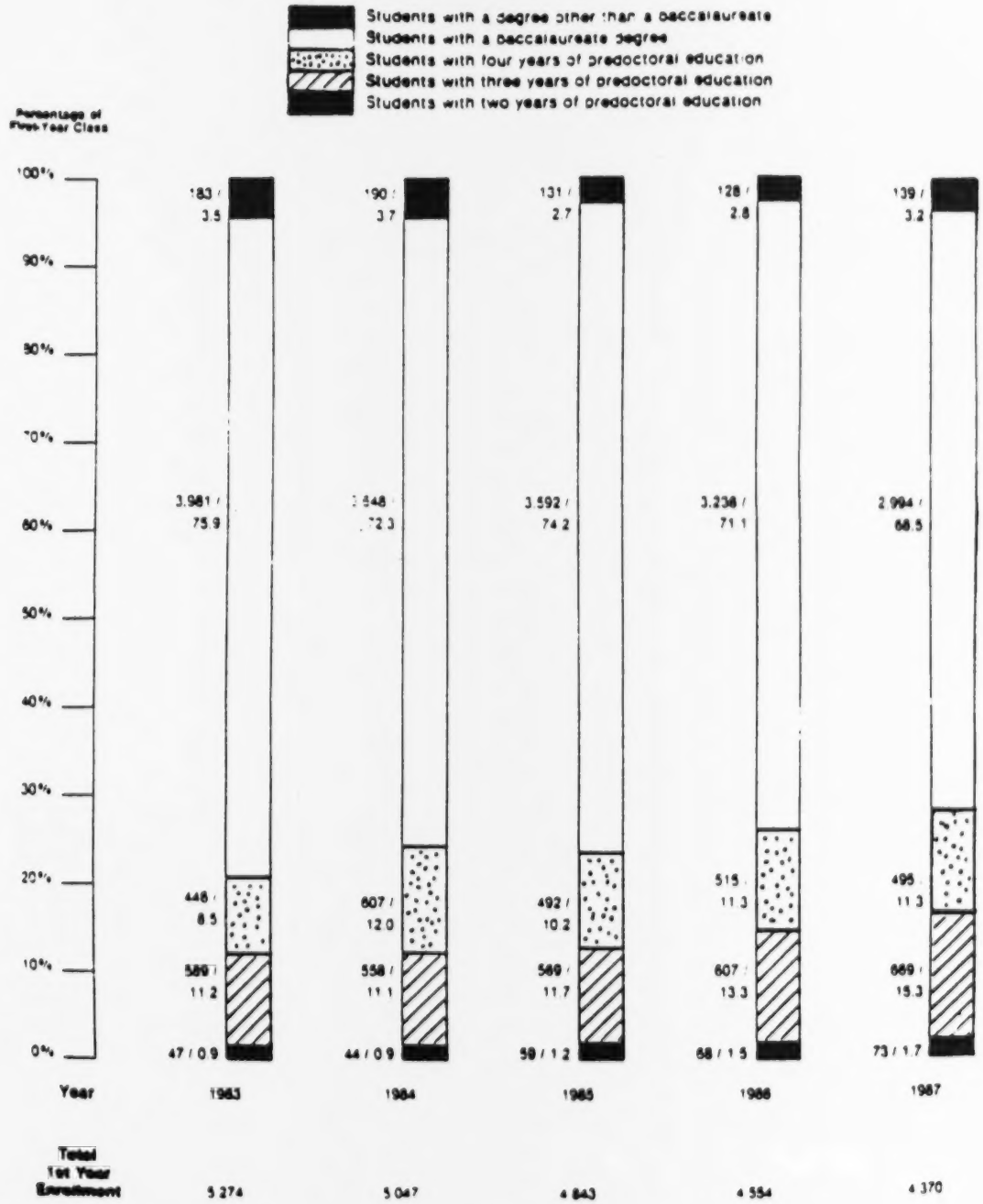
Dental School	Total Length of Program (wks.)	Type of Degree Granted	Type of Institutional Support
Creighton University	164	D.D.S.	Private
University of Nebraska	156	D.D.S.	Public
Fairleigh Dickinson University	143	D.M.D.	Private-State Related
U. of Medicine and Dentistry of New Jersey	144	D.M.D.	Public
Columbia University	161	D.D.S.	Private-State Related
New York University	152	D.D.S.	Private-State Related
State University of New York, Stony Brook	160	D.D.S.	Public
State University of New York, Buffalo	141	D.D.S.	Public
University of North Carolina	150	D.D.S.	Public
Ohio State University	162	D.D.S.	Public
Case Western Reserve University	144	D.D.S.	Private-State Related
University of Oklahoma	156	D.D.S.	Public
Oregon Health Sciences University	151	D.M.D.	Public
Temple University	154	D.M.D.	Private-State Related
University of Pennsylvania	159	D.M.D.	Private
University of Pittsburgh	175	D.M.D.	Private-State Related
Medical University of South Carolina	159	D.M.D.	Public
Meharry Medical College	161	D.D.S.	Private
University of Tennessee	162	D.D.S.	Public
Baylor College of Dentistry	159	D.D.S.	Private-State Related
University of Texas, Houston	160	D.D.S.	Public
University of Texas, San Antonio	144	D.D.S.	Public
Virginia Commonwealth University	157	D.D.S.	Public
University of Washington, Seattle	152	D.D.S.	Public
West Virginia University	152	D.D.S.	Public
Marquette University	150	D.D.S.	Private-State Related
University of Puerto Rico	168	D.M.D.	Public

SOURCE: American Dental Association, 1988.

Following completion of a required pre-professional college curriculum, dental education encompasses a four-year professional program culminating in a doctoral degree in dental surgery (D.D.S.) or in dental medicine (D.M.D). The degrees are equivalent and awarded upon completion of the same types of programs. Specialty training programs require two to three years of postdoctoral study. Applicants to dental schools must have a background in the sciences as well as in general education. The American Dental Association reports that over 80 percent of students in recent first-year dental classes have completed four or more years of pre-professional education (Figure 1).

FIGURE 1

LEVEL OF PRE-DOCTORAL EDUCATION OF FIRST-YEAR STUDENTS
IN U.S. DENTAL SCHOOLS
1983 TO 1987



SOURCE: American Dental Association, 1988.

Also, candidates to dental schools must take the Dental Admission Test which measures potential abilities as a dental student and as an eventual dental practitioner. Basic professional training includes study in three areas: the basic sciences, the clinical application of the health sciences to the delivery of oral health services (including diagnosis, treatment planning and performance of dentistry), and the application of basic biomedical and dental practice.

Data from the American Dental Association on national trends in dental education indicate a continual decline in interest in dentistry as a profession. The number of dental school applicants decreased by 50 percent between 1978 and 1987, and first-year enrollment declined from 6,301 to 4,370 in the nation's schools of dentistry during that ten-year period (Table 6). The drop in applicants produced a substantial negative effect on the ratio of applicants to first-year enrollment, with the ratio declining from 1.71 to 1.24 in that period.

TABLE 6

APPLICANTS AND FIRST-YEAR ENROLLMENTS IN U.S. DENTAL SCHOOLS 1977-78 TO 1986-87

Academic Year	Number of applicants	First-Year Enrollments	Ratio of Applicants/ First-Year Enrollments
1978	10,766	6,301	1.71
1979	10,000	6,132	1.63
1980	9,601	6,030	1.59
1981	8,852	5,855	1.51
1982	7,724	5,498	1.40
1983	7,128	5,274	1.35
1984	6,490	5,047	1.29
1985	6,216	4,843	1.28
1986	5,724	4,554	1.26
1987	5,398	4,370	1.24

SOURCE: American Dental Association, 1988.

As first-year enrollments have steadily declined, total pre-doctoral enrollments have also experienced decreases. Total pre-doctoral enrollment in 1978 was 22,179 as opposed to a total of 17,885 in 1987 (Table 7).

The decline in applicants reflects a diminished pool of prospective students and may be limiting the selectivity of schools of dentistry. Institutions may be dipping deeper into the applicant pool to fill available spaces. Possible repercussions of this may be seen in the numbers of students found repeating. The ADA reports that the number of repeating students was 464 in 1984 but 495 in 1987. Data on repeaters was not available prior to 1984.

TABLE 7

TOTAL PRE-DOCTORAL ENROLLMENTS AND
GRADUATIONS FROM U.S. DENTAL SCHOOLS
1977-78 TO 1986-87

Year	Total Enrollments	Graduations
1986-87	17,885	4,717
1985-86	18,673	4,957
1984-85	19,563	5,353
1983-84	20,588	5,337
1982-83	21,428	5,756
1981-82	22,235	5,378
1980-81	22,621	5,550
1979-80	22,842	5,256
1978-79	22,482	5,424
1977-78	22,179	5,324

SOURCE: American Dental Association, 1988.

The number of graduates from schools of dentistry fluctuated in the years between 1978 and 1987 (Table 7). Following an initial increase during most of the late 1970's and early 1980's, the number of graduates has decreased almost annually to 1987.

The participation of women and racial/ethnic minorities in dental education has generally increased since 1978 (Table 8). The proportion of women in first-year enrollments rose from 27.1 percent in 1983 to 32.3 percent in 1987. Blacks accounted for a higher percentage of enrollments in 1987 than in 1983 but fewer in number, dropping from 299 black enrollees in 1983 to 280 in 1987. Hispanics increased both proportionally and numerically during the four-year period. While Hispanic numbers are higher than black figures for first-year enrollments, the inclusion of 25 to 35 students annually from the University of Puerto Rico School of Dentistry accounts for part of that difference.

Limited information on the graduates of U.S. dental schools by gender and race/ethnicity suggests that women, blacks, and Hispanics are slowly increasing their representation in the dental profession (Table 9). All three minority groups experienced slight percentage increases between 1985 and 1987. Numerical indicators, however, reflect a different picture as the numbers of women, blacks, and Hispanics graduating fluctuated. The U.S. Department of Health and Human Services projects that by the year 2000 there will be 6,300 black dentists and 4,200 Hispanic dentists, increases of 66 percent and 75 percent respectively. The U.S. aggregate increase during the 1985-2000 period is 14 percent. Although the increases in numbers seem appreciable, black and Hispanic dentists will still not be one-third of parity.

TABLE 8

FIRST-YEAR ENROLLMENTS IN U.S. DENTAL SCHOOLS
BY GENDER AND RACE/ETHNICITY
1984 TO 1987

Year	Total	MALE		FEMALE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
1987	4370	2960	67.7	1410	32.3	280	6.4	358	8.2
1986	4554	3167	69.5	1387	30.5	286	6.3	316	6.9
1985	4843	3519	72.7	1324	27.3	281	5.8	312	6.4
1984	5047	3678	72.9	1369	27.1	299	5.9	264	5.2

SOURCE: American Dental Association, 1988.

TABLE 9

GRADUATES OF U.S. DENTAL SCHOOLS
BY GENDER AND RACE/ETHNICITY
1985 TO 1987

Year	Total	MALE		FEMALE		WHITE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1987	4717	3581	75.9	1136	24.1	3869	82.0	210	4.5	231	4.9
1986	4957	3863	77.9	1094	22.1	4162	84.0	195	3.9	208	4.2
1985	5353	4213	78.7	1140	21.3	4522	84.5	223	4.2	213	4.0

SOURCE: American Dental Association, Annual Reports 1985-86 through 1987-88.

E. Dental Education in Florida: College of Dentistry, University of Florida

Background

The College of Dentistry at the University of Florida is the only dental school in the State. Although the legislature designated UF as the site of a proposed college of dentistry in 1957, little developed until 1963 when the Florida Dental Association endorsed the establishment of the college. The University initiated internal procedures in 1965 to organize the College, and the first dean was named in 1966. It was not until Fall 1972, however, that the charter class was enrolled. During the six-year interim, facilities were constructed as part of a building expansion program for the J. Hillis Miller Health Center. Construction was funded in part by a legislative appropriation and in part through a National Institutes for Health grant. The College is located in the Health Science Center complex, which also includes the Colleges of Medicine, Nursing, Health Related Professions, Pharmacy, and Veterinary Medicine as well as the Shands Hospital and Clinics. The Dental Sciences Building has facilities for dental outpatient clinics, postgraduate and specialty clinics, faculty offices, seminar rooms, and teaching and research laboratories. The College is fully accredited by the Commission on Dental Accreditation of the American Dental Association. The Board of Regents conducted a program review of dentistry in 1986. In his report to the Board, the consultant engaged to assist in the review stated: "The College of Dentistry of the University of Florida appears to be on the threshold of growth in quality to the point of attaining a national leadership role."

Curriculum

Dental education at the University of Florida is a four-year program to prepare students for general practice. The first two years concentrate on the basic biological sciences and pre-clinical dental technique while the final two years center on clinical experiences including diagnosis, treatment planning, and patient care. The dental curriculum is structured into a core and an electives program. During the first-year core courses, teaching is interdisciplinary and interdepartmental, with teaching teams drawn from the Colleges of Dentistry and Medicine. The didactic portion of the pre-clinical technical program is mainly self-instructional and built on self-paced modules. Clinical experiences are similar to those of a dentist in private practice. Implemented during the initial enrollment years, the flexible modular curriculum and the use of audiovisual materials for self-instruction received national attention and were incorporated by other dental schools.

Two dental outreach clinics have provided access to dental service to older rural and disadvantaged inner-city residents as well as enhanced the clinical experiences of students. In 1977 a rural clinic, the Lafayette County Dental Health Center, was dedicated in Mayo in cooperation with the Lafayette County Public Health Trust. At that time, it was one of the few college-sponsored satellite clinics in the nation operated on a full-time basis in a rural community. Until its closure in 1988, dental students rotated through the clinic, working several weeks at a time. A second outreach facility was opened in 1986 to serve urban inner-city Jacksonville residents. Effective

October 1987, the Legislature allocated operating funds annually for the clinic.

Advanced education programs are also available in Oral and Maxillofacial Surgery, General Practice, Oral Pathology, Orthodontics, Periodontics, Dental Public Health, Pedodontics, Advanced General Dentistry, and a Graduate Program jointly sponsored by the Departments of Dental Biomaterials and Materials Science and Engineering.

Faculty

During Fall 1988 the College employed 93 full-time faculty and 15 part-time. As the entering class size has remained at between 75 and 80 students for a number of years, the number of faculty has changed little in recent years.

During the Fall 1988 semester, the College successfully completed a campaign to establish an Eminent Scholar Chair in Clinical Dentistry. The College raised $600,000 to match $400,00 in State funds under the Eminent Scholar Trust.

Enrollments and Graduations

The College attracts students from the entire State as well as many from out-of-state. In each entering class, one or two students are non-residents. Enrollment trends in Florida's dental school have not paralleled that of most other dental schools in the nation as others have experienced large declines. Also, whereas the applicant-to-entering class position ratio nationally has declined to 1.24, the University of Florida has maintained a 2-to-1 ratio of qualified in-state applicants per position in addition to a large number of out-of-state applicants.

Following the charter class enrollment of 24 students in 1972, the size of the entering classes grew steadily until recent years when it has remained constant at approximately 75 students. Total enrollment has fluctuated somewhat in the past eight years, peaking at 301 in 1984-85 (Table 10). The current total is 283 students in the dental professional program. In addition, there are presently 38 students enrolled in advanced education, a growth of almost 100 percent over the earlier years of this decade.

As with enrollment, the number of degrees granted has varied little during the 1980's (Table 11). With the exception of an unusually high number of awards in 1985-86, between 65 and 70 degrees have been awarded annually since 1983-84.

TABLE 10

TOTAL ENROLLMENTS IN THE COLLEGE OF DENTISTRY
UNIVERSITY OF FLORIDA
BY GENDER AND RACE/ETHNICITY
FALL 1981 TO FALL 1988

Year	Total	MALE		FEMALE		WHITE & OTHER		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1981	273	212	77.7	61	22.3	243	89.0	9	3.3	21	7.7
1982	288	230	79.9	58	20.1	250	86.8	10	3.5	28	9.7
1983	299	232	77.6	67	22.4	257	86.0	11	3.7	31	10.4
1984	301	234	77.7	67	22.3	250	83.1	11	3.7	40	13.3
1985	295	235	79.7	60	20.3	239	81.0	13	4.4	43	14.6
1986	281	199	70.8	82	29.2	211	75.1	17	6.0	53	18.9
1987	288	193	67.0	95	33.0	216	75.0	18	6.2	54	18.8
1988	283	187	66.1	96	33.9	212	74.9	17	6.0	54	19.1

SOURCE: University of Florida, 1988.

TABLE 11

DEGREES GRANTED BY THE COLLEGE OF DENTISTRY
UNIVERSITY OF FLORIDA
BY GENDER AND RACE/ETHNICITY
1981-82 TO 1987-88

Year	Total	MALE		FEMALE		WHITE & OTHER		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1981-82	64	50	78.1	14	21.9	59	92.2	3	4.7	2	3.1
1982-83	59	48	81.4	11	18.6	51	86.4	2	3.4	6	10.2
1983-84	65	46	70.8	19	29.2	60	92.3	2	3.1	3	4.6
1984-85	69	52	75.4	17	24.6	60	87.1	2	2.9	7	10.2
1985-86	78	69	88.5	9	11.5	68	87.2	3	3.8	7	9.0
1986-87	69	55	79.7	14	20.3	54	78.3	2	2.9	13	18.8
1987-88	70	47	67.1	23	32.9	54	77.14	6	8.6	10	14.3

SOURCE: University of Florida, 1988.

Minority Participation

The participation of racial/ethnic and gender minorities in the University of Florida dental program has generally improved during the 1980s (Table 10). Among women, blacks, and Hispanics, the UF dental program consistently exceeds national percentages for both enrollments and degrees awarded.

Numerically since 1981-82, women have increased their representation by approximately 50 percent, and accounted for 33 percent of total enrollment in 1987-88. This is higher than the national figure of 29.4 percent for that year. Women in the UF program have also earned an increasing share of the degrees awarded, garnering almost 33 percent in 1987-88 (Table 11). Nationally that year, women comprised 24.1 percent of dental school graduates.

Blacks have almost doubled their numbers, from 9 in 1981-82 to 17 in 1988-89. Black enrollment was 6.2 percent of the total enrollment in 1987-88 at UF compared to 5.6 percent for all dental schools. During 1987-88, the number of blacks awarded dental degrees in Florida increased considerably over previous years, yet only 8.6 percent of all degrees went to blacks. Nonetheless, this was almost double the 4.5 percent reported nationally.

Hispanics have increased their representation by 150 percent, with a significant growth in numbers from 21 in 1981-82 to 54 in 1988-89. Hispanic enrollment in 1987-88 was 18.8 percent of total enrollment at UF, almost three times the national figure of 6.7 percent. Hispanics received 14 percent of dental degrees granted by UF in 1987-88 for a total of 10 degrees. Among all dental schools in the U.S., Hispanics represented only about five percent of all degree recipients.

Research

The Commission's 1984 study of dental education in Florida also examined the program at the University of Florida. One of the recommendations made at that time was to increase the emphasis on establishing a strong research component in the College of Dentistry. The areas of geriatrics and gerontology were suggested as research areas. Since that report, the College has strengthened its research component through increased external funding, addition of faculty, and increased enrollments in the advanced education programs. In conjunction with the College of Medicine, the College has a federally-funded Geriatric Education Center and a Geriatric Dentistry Training Program. In extramural research funding alone, the College currently receives more than $3 million, ranking it among the top 20 percent of all dental schools.

Among the grants supported externally are two centers funded by the National Institute of Dental Research (NIDR). In 1986 a $1.5 million grant covering a three-year period was awarded to the College's Periodontal Disease Research Center (PDRC), a multidisciplinary unit. The grant involves dental faculty from five of the College's departments, dental students, and faculty from other colleges within the University. The PDRC received funding for an additional five-year period in September, 1988. In Fall 1988, the second NIDR award of $3.7 million was designated for a Research Center on Oral Health in Aging. This is the nation's first federally-funded research center to

investigate the effects of aging on oral health and to improve treatments for oral health problems often found in the elderly.

In addition to these major accomplishments, the College has been recognized by the Pew Memorial Trust of Philadelphia for two outstanding awards to assess programs and develop strategic plans for change. In 1986, the College was awarded $90,000 to conduct a two-year study culminating in the development of a strategic plan for change and renewal. Upon completion of this award, the College successfully competed this year for a second grant totaling $809,000 over a five-year period to assist the College in implementing major institutional change and redirection in education, research, patient care, and service. The strategic goals to be implemented in this phase of the award focus on (1) extramural outreach, (2) geriatric dentistry, (3) computer technology, (4) collaborative research, (5) cost containment, and (6) adaptive planning. Under the first goal, the College is examining options to establish clinics in the Miami and Tampa/St. Petersburg areas, much like the current Jacksonville clinic, to provide care for underserved people and to serve as sites for continuing education of dental health personnel in those areas.

F. Dental Manpower

As with other health professions in this decade, the field of dentistry has been marked by unforeseen factors that have had significant impact on the supply of practicing dentists. Manpower supply in many of the health professions has been affected, for example, by the overall reduction in the traditional college-age group, by career preference changes among both men and women, and by concern over the risk of contacting communicable diseases through health work. The demand for dental service, on the other hand, is very elastic and influenced by dental care needs. These are determined by such factors as age, geographic location, income, education, race, and availability of dental benefit plans and government subsidies for dental services. The Bureau of Economic and Behavioral Research reports that between 1970 and 1986, dental expenditures per capita in the U.S. rose from $22.77 to $126.64. This period also witnessed a growth in private dental prepayment. In 1970, four percent of dental care expenditures were paid by private insurance plans compared to 33 percent in 1986. The Bureau estimated that 61 percent of patients treated by independent practitioners in 1986 were at least partially covered by private dental insurance. An additional 5.1 percent were covered by public assistance programs.

Variables that influence dental manpower supply and demand have changed, and, as the following sections illustrate, previous perceptions of future dental manpower are now undergoing reevaluation. Until recently, the manpower picture was depicted generally as one oversupplied with dentists. Indicators now suggest, however, that the supply/demand situation may not be as unbalanced as was predicted only a few years ago. The U.S. Department of Health and Human Services (DHHS) manpower forecast predicts "faster growth in demand for dental services than the productive capacity of dental sectors over the remainder of the century due to anticipated tightening of dentist supply in the last decade of this century."

National Dental Manpower

The supply of active dentists during the 1990s and the early years of the new century is expected to continue to grow steadily although the number of dental school graduates will decline. Consequently, the ratio of active-dentists-to-population is also expected to begin decreasing by the early part of the next decade. The DHHS estimates there were 143,000 active dentists in the United States in 1986 and projects 156,300 by the year 2000 but 145,800 by the year 2020 (Table 12). The U.S. Department of Health and Human Services reports a dentist-to-100,000-population ratio of 58.9 in 1986. That ratio is expected to increase slightly by 1990 and then begin a steady decline to 49.2 by the year 2020 (Table 12). The American Dental Association projects a similar, but stronger, downward trend ending with a 44.8 ratio in the year 2020 (Figure 2).

TABLE 12

NUMBER OF ACTIVE DENTISTS AND DENTIST-TO-POPULATION RATIOS: ESTIMATED FOR 1986 AND PROJECTED FOR SELECTED YEARS, 1990 to 2020 [1]

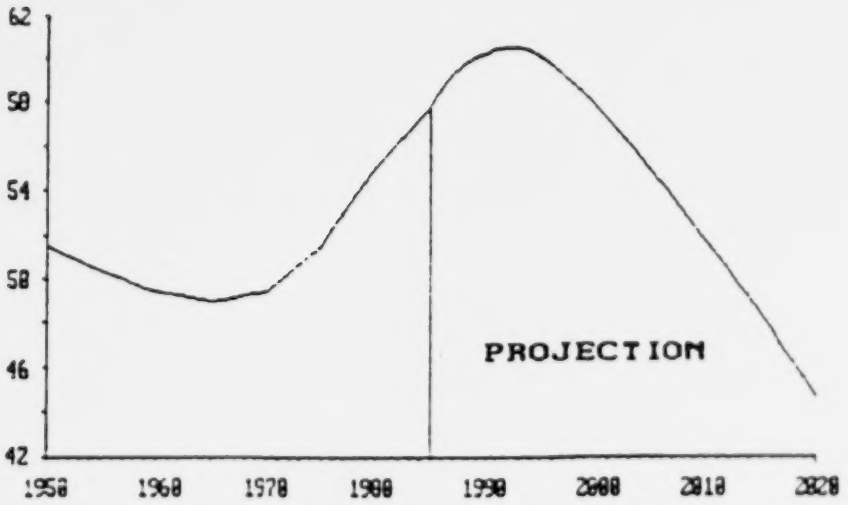
Year and Alternative Projection	Number of Active Dentists	Active Dentists per 100,000 Total Population
1986	143,000	58.9
1990	150,300	59.9
Low	150,300	59.9
High	150,300	59.9
2000	156,300	58.3
Low	154,100	57.5
High	161,600	60.3
2010	154,700	54.6
Low	148,500	52.4
High	168,100	59.3
2020	145,800	49.2
Low	135,800	45.8
High	166,800	56.2

[1] The basic methodology was used for the projections shown for the years 1990 through 2020; alternative assumptions were used for the low and high projections. Includes dentists in Federal service.

SOURCE: U.S. Department of Health and Human Services, 1988.

FIGURE 2

ACTIVE DENTISTS IN THE U.S.
PER 100,000 POPULATION
1950 TO 2020



SOURCE: American Dental Association, 1988.

A significant variable in the ratio calculation is the anticipated number of new dentists graduating from the nation's schools of dentistry, and there is little doubt that this number will continue to fall. The U.S. Department of Health and Human Services (DHHS) estimates that between 1986 and 1998 the number of dental school graduates will decline from 4,870 to 3,420 and then level off until about the year 2020 at 3,350 graduates (Table 13).

TABLE 13

NUMBER OF FIRST-YEAR DENTAL STUDENTS AND NUMBER OF DENTAL GRADUATES BY GENDER: PROJECTED FOR ACADEMIC YEARS 1986-87 THROUGH 2019-20 [1]

Academic Year	Number of First-Year Students			Number of Graduates		
	Total	Male	Female	Total	Male	Female
1986-87 [2]	4,554	3,167	1,387	4,870	3,660	1,210
1987-88	4,300	2,950	1,350	4,660	3,400	1,260
1988-89	4,220	2,850	1,370	4,470	3,250	1,220
1989-90	4,140	2,750	1,390	4,210	2,930	1,280
1090-91	4,070	2,670	1,400	3,970	2,730	1,240
1991-92	4,000	2,580	1,420	3,900	2,640	1,260
1992-93	3,920	2,490	1,430	3,820	2,540	1,280
1993-94	3,850	2,410	1,440	3,760	2,470	1,290
1994-95	3,780	2,330	1,450	3,700	2,390	1,310
1995-96	3,710	2,250	1,460	3,620	2,300	1,320
1996-97	3,630	2,160	1,470	3,550	2,230	1,320
1997-98	3,630	2,160	1,470	3,490	2,160	1,330
1998-99	3,630	2,160	1,470	3,420	2,080	1,350
1999-2000 through 2019-20	3,630	2,160	1,470	3,350	2,000	1,350

[1] The basic methodology was used for all of these projections. It is assumed that the number of first-year students will continue to decrease during the next 10 years at about two thirds the rate of the last 10 years, and then stabilize. It is also assumed that the proportion of female students will continue to increase gradually during the next 10 years at a little more than half the rate of the last 10 years.

[2] First-year students for 1986-87 are actual figures.

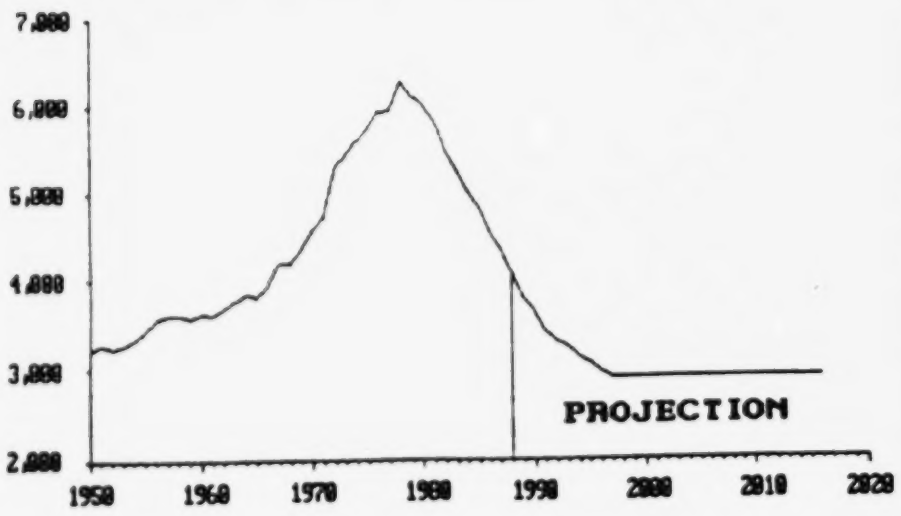
SOURCE: U.S. Department of Health and Human Services, 1988.

A similar movement is forecast by the American Dental Association. Dental manpower projections released this year anticipate a significant, steady decline in first-year-enrollments nationally that will produce a resulting decline in the number of dental graduates for manpower supply by the year 2020 (Figure 3). The ADA report projects a decrease in first-year-enrollments from 4,370 in 1987 to 2,948 in 1996 or 67 percent of the 1987 level. By 1996, the decline will subside and first-year enrollments will stabilize at about 2,900. The ADA foresees the number of total active dentists increasing to about 154,651 until about 1996 and then decreasing to 137,365 by the year 2020.

FIGURE 3

FIRST-YEAR ENROLLMENT IN U.S. DENTAL SCHOOLS
1950-2020

First-year Enrollment Projections	
Year	FYE
1987	4,370
1988	4,100
1989	3,792
1990	3,651
1991	3,422
1992	3,295
1993	3,234
1994	3,114
1995	3,062
1996	2,948
1997 to 2016	2,899



SOURCE: American Dental Association, 1988.

Little has been produced projecting demand for dental services. Forecasting is risky, particularly during periods of rapid change which have characterized the decade of the 1980s. In explaining the difficulties in estimating demand, the U.S. DHHS report points out that forecasting involves predicting changes within the framework of the national economy. Changes are occurring in the general economy which make the forecasting of national economic performance, an important factor in dental demand, extremely difficult. The report enumerates changes which have potential effects on the future performance of the dental care sector: population demographic composition, values which the general population places on dental services, labor markets, financing mechanisms, the underlying rates of dental diseases, the legal and regulatory climate, and the supply of dentists.

A key variable in forecasting demand for dental services is recent trends in national expenditures for dental care. Table 14 shows actual and predicted growth in total real dental care expenditures between 1965 and 2015 using two data bases. The lower economic growth scenario produces increases of 48 and 41 percent respectively between 1985 and 1995 using the two data bases. These are 11 and five percent below growth in the ten-year period 1975-1985. Growth in total real dental care expenditures is expected to continue to increase but at a decelerated rate, with 36 percent and 32 percent forecast for the lower economic growth scenario in the period 2005 to 2015. Two key assumptions underlying these predictions are sustained economic growth and stable environmental conditions within the dental industry.

TABLE 14

ACTUAL AND FORECAST PERCENT GROWTH IN TOTAL REAL DENTAL CARE EXPENDITURES 1965 TO 2015

	Percent Growth Total Real Dental Care Expenditures	
Period	HCFA Data[1]	NIPA Data[2]
1965-75	72	64
1975-85	59	46
1985-1995 forecast*	49	41
1985-1995 forecast**	48	41
1995-2005 forecast*	47	41
1995-2005 forecast**	35	31
2005-2015 forecast*	49	44
2005-2015 forecast**	36	32

* Scenario One assumes a constant 2.5 percent annual growth rate.
** Scenario Two assumes a lower economic growth.

[1]Health Care Financing Administration (HCFA) data include expenditures for dental care provided by governmental facilities while NIPA data do not. Also, HCFA adjusts its estimates based upon dental employment data while NIPA does not.

[2]National Income and Product Accounts (NIPA).

SOURCE: U.S. Department of Health and Human Services, 1988.

The DHHS forecast also states that the 1970s was characterized by a general decline in the real price of dental services, a trend which indicated that the supply of dental services (and of dentists) was growing faster than the demand for those services over the decade. A reversal of the trend occurred in 1981. The DHHS projections suggest that the increase in dental prices will continue as the demand for dental services grows relative to the supply for the remainder of the century and beyond.

The DHHS concludes that the imbalance between continued demand and declining supply will begin to cause significant dislocation in the dental services market after the year 2010 but goes on to suggest that adjustments in productivity will occur to offset the dislocations.

Florida Dental Manpower

The Florida Department of Professional Regulation reports that as of Fall, 1988 there were 8,282 licensed dentists. Of these, the Bureau of Economic and Business Research at the University of Florida estimates that 5,112 are actively practicing in the State. As presented in Chapter Two, an average of 369 new licenses have been granted annually in recent years, with a trend toward fewer licenses awarded each successive year.

The elimination of entering classes at two dental schools in the South and the national decline in enrollments suggest that the number of licenses granted annually will continue to decline, producing an overall reduction in the supply of new dentists for the State in the future. For Florida, the recent ADA manpower supply report projects a decline in the ratio of active dentist-to-population ratio between 1985 and 2020 from 49.5 to 39.3. This would be the lowest in the South Atlantic region and lower than the projected national ratio of 44.8. The ADA estimates a growth in the number of active dentists between 1985 and 2020, from 5,556 to 7,836.

Dental supply and requirement projections prepared by the University of Florida Center for Health Policy Research for the Department of Health and Rehabilitative Services in 1986 suggest that if demand for dental services increases steadily during the remainder of this century, current short-term surpluses may disappear and supply and requirements may balance by the year 2000. Tables 15 and 16 illustrate the Center's forecasts with variations in supply and requirement. For the year 2005 and considering the highest supply, these estimates project a 23.71 percent undersupply if the highest requirement is used and a near balance or 0.36 difference if the lowest requirement is used. For that same year if lowest supply is used, the forecast estimates an undersupply of 29.3 percent with the highest requirement scenario and an undersupply of 5.39 percent, or near balance, if the lowest requirement is used.

TABLE 15

FLORIDA DENTAL MANPOWER PROJECTIONS
UNDER HIGH SUPPLY ASSUMPTIONS
1990 TO 2005

Year	Highest Supply	Highest Requirement	Difference #	Difference %	Lowest Requirement	Difference #	Difference %
1990	6085	6814	- 729	-11.98	5757	+328	+5.39
1995	6752	7570	- 818	-12.11	6347	+405	+6.00
2000	7304	8623	-1319	-18.06	7144	+160	+2.19
2005	7727	9559	-1832	-23.71	7755	- 28	-0.36

SOURCE: Center for Health Policy Research, University of Florida, 1986.

TABLE 16

FLORIDA DENTAL MANPOWER PROJECTIONS
UNDER LOW SUPPLY ASSUMPTIONS
1990 TO 2005

Year	Highest Supply	Highest Requirement	Difference #	Difference %	Lowest Requirement	Difference #	Difference %
1990	6211	6805	- 594	- 9.56	5749	+462	+7.44
1995	6784	7535	- 751	-11.07	6324	+460	+6.78
2000	7161	8597	-1436	-20.05	7142	+ 19	+0.27
2005	7402	9571	-2169	-29.30	7801	-399	-5.39

SOURCE: Center for Health Policy Research, University of Florida, 1986.

In a dissenting opinion presented by the Florida Dental Association in a paper prepared for the Commission in October, 1988, the Association concluded that there will be sufficient numbers of dentists to meet the dental needs of Florida residents in the future: "Based on the current figures and future projections, the supply of dentists is more than adequate to meet current consumer demands and projected needs."

In sum, there is general agreement that Florida's supply of dental manpower will not continue to grow at the same rate as in the past. Yet, given the low growth in supply into the early years of the new century and some increase in demand, projections indicate that the residents of Florida will continue to be well served with dental services. Although the current dental manpower situation shows supply in excess of demand, this will dissipate as the end of the century approaches. Current data and projections anticipate a balance in dental manpower supply and demand by the turn of the century.

III. DENTAL HYGIENE

A. The Profession

By the beginning of the twentieth century, dentists were delivering prophylactic care, but found it time-consuming and expensive for patients. A training program for the "dental nurse and assistant" was initiated in 1910 at the Ohio College of Dental Surgery, but closed by a group of dentists after graduating only one class from its one-year program. A Connecticut school board, however, funded a dental hygienist training program three years later for those intending to serve school children. The first state practice act to permit hygienists to practice under dental supervision was effected in 1915, also in Connecticut. Subsequent years witnessed increasing numbers of state laws addressing the issue, along with the endorsement of dental hygiene legislation by the American Dental Association (ADA). By 1951 hygienists were licensed throughout the United States.

Dental hygienists function as oral health clinicians and educators whose responsibilities center around preventive and therapeutic care with a goal of assisting the public to develop and maintain good oral health. The type and the frequency of specific duties vary according to the state in which they work, the people with whom they work, and their education, training, and experience. Dental hygienists employed in private dental offices provide direct patient care, seeing an average of about eight patients per day, or about one per hour. Nontraditional hygienists, slightly over seven percent of all hygienists nationally, are employed in other settings, such as public health agencies and clinics, hospitals, dental colleges, health maintenance organizations, and business and industry. Hygienists are increasingly moving into areas with special populations, such as the hospitalized, the homebound, and day care clients. All dental hygienists participate in oral prophylaxis and chairside education, but the percentage of their day doing so ranges from ten to 99 percent.

Other services which may be provided by hygienists (listed in order from most to least daily time consumed) include taking and processing X-rays, performing office management procedures, dental assisting, conducting formal plaque control, performing restorative procedures, and doing laboratory work. Certain services are provided by dental hygienists more often than others. For adult patients, the most common are taking X-rays, root planing, and applying topical fluoride. The least common are administering nitrous oxide, placing sealants, administering local anesthesia, placing restorations, providing chemical curettage, and performing gingivectomies.

The ability of the dental hygienist to perform expanded functions duties is reported to improve overall dental care in several ways. The supervising dentist is freed to concentrate on more complex tasks when the hygienist has been delegated expanded functions duties. Current trends toward increased periodontics imply additional need for the hygienist to assure patients' comfort by providing services that will prevent prolonged waiting for the dentist to leave one patient to attend to another. Consequently, dental hygienists with expanded functions responsibilities, particularly in states with less restrictive practice acts, may be permitted to administer local anesthesia, apply sealants, and perform periodontal therapy.

All but very few dental hygienists are young women. Ninety percent of the workforce is 44 years old or younger and 99 percent is female. Although little is known about the total number of active licensed dental hygienists, a 1987 American Dental Hygienists Association report found that dental hygienists worked an average of 4.0 days per week at the setting they work the most time. It is perhaps in part for this reason that hygienists often perceive the profession more as a "job" than as a "career."

B. Licensure

National

Among dental auxiliaries, only hygienists are licensed. Licensure results must be certified by a state licensing board which is usually composed primarily of dentists. Each state has its own practice act stipulating licensure requirements. Satisfactory evidence of knowledge of the laws and rules regulating practice, as well as evidence of clinical competence, must be presented. Most states accept, and many require, successful scores on the National Board Dental Hygiene Examination to satisfy the written portion of these requirements.

Four regional examination boards located in the northeast, central, southern, and western areas of the nation offer a clinical examination for licensure applicants in the corresponding states, scores from which are acceptable or required in some states. Several states require successful completion of their own examination (written or clinical or both) in addition to or in place of other examination results. Delaware is the only state which presently accepts only its own examination.

Florida

After passing the Florida Board Dental Hygiene Examination, applicants for Florida licensure are automatically issued a dental hygiene license from the Board of Dentistry, Department of Professional Regulation. The Board of Dentistry has eleven members, of whom seven are licensed dentists, two are licensed dental hygienists, and two are lay persons. The Council on Dental Hygiene, which advises the Board on matters relating to licensure, education, and other matters, consists of one hygienist Board member, one dental Board member, and three practicing hygienists.

Eligibility to sit for the examination as mandated by Florida law is determined by successful completion of the National Board of Dental Hygiene examination within ten years preceding application to take the state examination and graduation from an accredited or Board-approved program of dental hygiene.

The Florida examination consists of a written test of Florida's practice laws and rules and a clinical component during which candidates must satisfactorily treat patients who meet specific criteria. Examination candidates who pass either or both of the components may retake those components during succeeding administrations up to a total of three times. The complete examination (written and clinical) is offered twice annually, usually in June and December. The written portion alone is administered again in March and

September each year for those who wish to retake it at that time. Candidates who fail more than three times must obtain additional appropriate education before re-applying to sit for the examination.

While still students, and just prior to graduation, examinees trained in Florida take a mock examination modeled after the state board examination. just prior to graduation. This may explain why more in-state candidates tend to pass the June administration than out-of-state candidates. Those out-of-state examinees who fail often comprise approximately 75 percent of candidates at the following winter examination.

The pass rate in Florida declined steadily (from 81.6 to 64.6 percent) between 1984 and 1986 (Table 17). The pass rate improved slightly, by 0.6 percent, in 1987 and substantially, by 21.4 percent, to 86.6 percent passing in June 1988. State law and rule changes clarifying test criteria and modifying scoring procedures during the three years preceding the June 1988 administration coincide with the decline in the number of examinees passing the examination prior to 1988. The June 1988 increase occurred at the first examination administration implementing the most recent changes in the grading scale.

TABLE 17

FLORIDA DENTAL HYGIENE EXAMINATION
PASS RATES AND LICENSES GRANTED
1984 TO 1988

Year	Candidates	Passed/Granted Licenses	
		Number	Percent
1984	418	341	81.6
1985	466	341	73.2
1986	491	317	64.6
1987	437	285	65.2
1988	305	264	86.6

Notes:
1. Each candidate passing the examination is automatically granted a dental hygiene license from the Board of Dentistry.

2. Data for 1988 include only the June 1988 administration.

SOURCE: Florida Department of Professional Regulation, 1988.

Minority Participation

The number of male candidates decreased from two in 1984 to zero in 1987 (Table 18). Although five males sat for the examination in June 1988, their representation was only 1.6 percent. As Table 14 indicates, two males passed the examination each year between 1984 and 1986. In 1988 four passed.

TABLE 18

FLORIDA DENTAL HYGIENE EXAMINATION CANDIDATES
BY GENDER AND RACE/ETHNICITY
1984 TO 1988

Year	Total	MALE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent
1984	418	2	0.5	5	1.2	16	3.8
1985	466	3	0.6	5	1.1	18	3.9
1986	491	2	0.4	6	1.2	24	4.9
1987	437	0	0.0	11	2.5	34	7.8
1988	305	5	1.6	5	1.6	30	9.8

Note: Data for 1988 include only the June 1988 administration.

SOURCE: Florida Department of Professional Regulation, 1988.

Black participation in the State dental hygiene examinations was relatively low and stable (five or six candidates annually) until 1987 (Table 18). During that year, their participation among examinees increased slightly to eleven, or 2.5 percent. In June 1988, however, their numbers declined to five (1.6 percent). Similarly, their pass rate was low, fluctuating between three (0.9 percent) in 1984 and four (1.5 percent) in 1988 (Table 19).

TABLE 19

FLORIDA DENTAL HYGIENE EXAMINATION PASS RATES
BY GENDER AND RACE/ETHNICITY
1984 TO 1988

Year	Total	MALE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent
1984	341	2	0.6	3	0.9	13	3.8
1985	341	2	0.6	4	1.2	13	3.8
1986	317	2	0.6	3	1.0	15	4.7
1987	285	0	0.0	4	1.4	21	7.4
1988	264	4	1.5	4	1.5	27	10.2

Note: Data for 1988 include only the June 1988 administration.

SOURCE: Florida Department of Professional Regulation, 1988.

Hispanics represented a tentatively increasing proportion of candidates. As seen in Table 18, in the 1984, 1985, and 1986 administrations, 16, 18, and 24 candidates, respectively, were Hispanic, accounting for 3.8 to 4.9 percent of the total. By 1988, 9.8 percent were Hispanic. Their pass rate (Table 19) more than doubled during the period, from 3.8 percent in 1984 to 10.2 percent in 1988.

C. Employment Sites

National

During this century, the most common employment setting of dental hygienists has gradually shifted from government to private dental offices. Hygienists now tend to locate in areas with high concentrations of dentists. The U.S. Department of Health and Human Services reports that in 1986 about 96 percent of dentists who owned or co-owned a dental practice employed dental auxiliary personnel on a full- or part-time basis. Fifty-four percent employed at least one full- or part-time dental hygienist. According to the Department, approximately 93 percent of all hygienists work in either solo or group dental offices. A recent survey of hygienists by the American Dental Hygienists' Association found that approximately one third of the respondents worked at more than one site. In areas where dental hygienists may practice independently, such as Colorado, the first state to permit autonomous practice and clinic ownership, they may work in their own private clinics.

Most state laws require dental hygienists to work under dental supervision. This usually is interpreted to mean at the same facility as the dentist and during the same hours. The three levels of supervision typically referred to

within the profession are "direct," "indirect," and "general." The extent to which supervision is direct (conducted such that the dentist is physically present in the same room as the dental hygienist) or indirect (conducted such that the dentist is in the same treatment facility) depends primarily on the restrictiveness of state regulations and the interpretation of the regulations by the employing dentist. General supervision connotes ultimate responsibility of the dentist for care given the patient.

The disparity in policy among states is wide. Dental hygienists may practice at least some preventive oral health services under general supervision in 38 states. In Washington, no supervision of dental hygienists is required in long-term care facilities. Some states allow general supervision only in institutional settings such as hospitals, adult day care centers, and nursing homes. Colorado provided in 1986 that dental hygienists could provide most basic functions without a dentist's supervision. In 1987, California implemented an experimental program as part of its Health Manpower Pilot Project (HMPP). Fifteen experienced and specially trained dental hygienists were permitted to clean and examine teeth without supervision, although case records were reviewed by a dentist.

Dental hygienists working in private dental offices earn an average hourly wage of approximately $14 according to a 1988 study by the ADHA. This represents an increase of about $4 per hour over the earnings reported in 1984. However, only 54 percent of traditional hygienists claimed to receive fringe benefits, a figure which confirms other indications that hygienists' pay is typically limited to salary or commission. The ADHA further noted that the fees generated by hygiene services are three times greater than the wages they receive. Annual earnings of over $25,000 were paid to only 13 percent of dental hygienists nationally in 1984, according to the ADHA.

Florida

Dental hygienists in Florida practice under varying levels of dental supervision, depending on the specific duty and the site. General supervision is allowed for performance of duties in public health programs and institutions of the Florida Department of Health and Rehabilitative Services, and in the home of nonambulatory patients. Patient education, prophylaxis, and certain other remedial duties may also be performed under general supervision. Most other duties must be performed under either indirect supervision (e.g., taking history, applying fluorides, and removing dressings) or direct supervision (e.g., root planing, curettage, and applying unfilled sealants).

Comprehensive data on employment characteristics of dental hygienists in Florida are not available. Although hygienists are licensed by the Department of Professional Regulation, they were not surveyed in 1986 by the Department of Health and Rehabilitative Services as were dentists. Consequently, little is know about the demographic or employment characteristics of Florida's dental hygiene workforce.

D. Education

National Programs

Accreditation of dental hygiene programs in the United States was standardized in 1947 when the requirements were developed by ADA and the American Dental Hygienists' Association (ADHA). Today, the Commission on Dental Accreditation of the American Dental Association accredits dental hygiene programs. After several modifications throughout the last forty years, current requirements include both liberal arts and science content and didactic and clinical instruction.

In Fall 1986 the ADHA began offering the standardized Dental Hygiene Candidate Admissions Test (DHCAT), in place of the Dental Hygiene Aptitude Test, as an option to assist programs in student selection. The DHCAT was developed in cooperation with Psychological Corporation of San Antonio, Texas to establish a common foundation for evaluating dental hygiene program applicants. The test was developed and piloted within the last five years, so is not widely used at this time. Some programs require it, others do not but will accept scores received. Still other programs do not use the test at all. Programs using the DHCAT combine results, as stipulated by their own admissions policies, with applicants' academic records and other background information.

Dental hygiene programs vary nationally in duration and credential offered. Some require four years, culminating in a baccalaureate degree, while the majority are two-year or longer associate degree programs. Some certificate programs are available as well. At the graduate level, master's and doctoral degree programs generally prepare students to teach, administer, work in public health, and/or become involved in research and graduate education. Despite the variation in length and content at the undergraduate level of educational preparation, only one entry level exists for licensure.

The number of programs grew in the U.S. between 1950 and 1984, from 26 to 200. Data collected by the American Dental Association indicate a total of 197 accredited and operating dental hygiene programs in Fall 1987.

Florida Programs. Florida offers nine accredited programs (two of which currently have conditional approval from the ADA Accrediting Council) at the associate degree level (see Appendix A). The newest program began enrolling students in Fall 1986. All nine programs are in public community or junior colleges and require four to seven semesters of didactic preparation and clinical practice. Although program curricula vary somewhat statewide, preparation includes general education requirements, basic sciences, dental sciences, and dental hygiene sciences in addition to the practice component.

Graduates are eligible to take the national board examinations and, following successful completion of those, the state board examinations. According to the Council on Dental Education of the American Dental Association, in-state students in Florida hygiene programs can expect to pay from $2,555 to $4,855 and out-of-state students from $4,264 to $7,910 in total cost for their education.

National Enrollments and Completions

Enrollment figures reflect the trends in program growth and decline. In 1950, 1,500 students enrolled, and in 1984 approximately 9,000 students were in dental hygiene programs. As Table 20 illustrates, by Fall 1986, national enrollments had dropped slightly to 8,923. Similarly, national completion rates vacillated, growing from 4,137 in 1973 to 5,184 in 1980, then decreasing to 4,037 in 1986.

TABLE 20

NATIONAL AND FLORIDA ENROLLMENTS AND COMPLETIONS IN DENTAL HYGIENE PROGRAMS 1983-84 TO 1986-87

Year	U.S.		Florida	
	Enrollments	Completions	Enrollments	Completions
1983-84	9649	4562	551	193
1984-85	9180	4362	528	241
1985-86	9066	4024	518	183
1986-87	8923	4037	573	207

SOURCE: American Dental Association, 1988 and Florida State Board of Community Colleges, 1988.

Florida Enrollments and Completions. As with the national situation, total enrollments in Florida experienced a slight decrease between 1983-84 and 1985-86, from 551 to 518 (Table 20). Enrollments increased to 573, however, in 1986-87, resulting in 4.0 percent growth over the four-year period. The newest program enrolled 12 students in Fall 1986, accounting for part of the increase.

Completions from Florida programs fluctuated between 193 and 207 during the four years, peaking in 1984-85 at 241 and descending to a low of 183 the following year (Table 20). Nevertheless, the overall change is a 7.3 percent increase in the number of graduates statewide.

During a 1987 Commission staff survey of program directors, most perceived some decline during the preceding few years in the number and quality of applicants. Factors such as evolving career possibilities for women, uncertainty about the implications of diseases such as AIDS, and increases in costs to students for required supplies and equipment were offered as possible causes for these decreases.

Minority Participation

On the whole, participation by gender and racial/ethnic minority groups in dental hygiene is tentatively on the increase. Completions are slightly more uncertain than enrollments, as indicated by fluctuations in the data.

Male participation in dental hygiene enrollments vacillated statewide between 1984-85 and 1986-87, starting at 0.6 percent, peaking at 1.0 percent, and slipping the following year to 0.9 percent (Table 21). A steady decline, however, is evident among male completers during the same three years (Table 22). No males graduated in 1986-87.

TABLE 21

ENROLLMENTS IN FLORIDA DENTAL HYGIENE PROGRAMS BY GENDER AND RACE/ETHNICITY 1984-85 TO 1986-87

Year	Total	MALE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent
1984-85	528	3	0.6	12	2.3	56	10.6
1985-86	518	5	1.0	14	2.7	56	10.8
1986-87	573	5	0.9	20	3.5	62	10.8

SOURCE: State Board of Community Colleges, 1988.

TABLE 22

COMPLETIONS IN FLORIDA DENTAL HYGIENE PROGRAMS BY GENDER AND RACE/ETHNICITY 1984-85 TO 1986-87

Year	Total	MALE		BLACK		HISPANIC	
		Number	Percent	Number	Percent	Number	Percent
1984-85	241	2	0.8	5	2.1	32	13.3
1985-86	183	1	0.6	3	1.6	16	8.7
1986-87	207	0	0.0	7	3.4	22	10.6

SOURCE: State Board of Community Colleges, 1988.

Black students enrolled in increasing proportions, from 12 to 20 numerically or 2.3 to 3.5 percent. Their representation among completers was more tentative, descending from 2.1 to 1.6 percent in 1985-86, but then climbing in the final year to 3.4 percent (five, three, and seven graduates respectively).

Enrollment of Hispanics remained relatively stable during the period, with 56 enrollees in the first two years and 62 students in 1986-87. Although 1985-86 was the low point of these three years for Hispanic graduates (8.7 percent of

the total), they began the period with 13.3 percent participation and ended it with 10.6 percent of the total or 22 completers. Overall, however, a 3.2 percent decline is evident.

E. Manpower

National

The supply of dental hygienists has grown significantly since the 1950s. The United States Department of Health and Human Services estimated the number of active dental hygienists at 3,200 in 1950 and 47,700 in 1986. In 1985, the national practitioner-to-population ratio was one to 1,300. Data from the American Dental Association (ADA) indicate a greater than five-fold increase between 1955 and 1984 in the percent of independent dentists employing dental hygienists. The number of dental hygienists per 100 active dentists has changed substantially from 4.0 to 33.3 during this period.

While some data exist on the supply of hygienists, at the national level there is little information on the demand side of manpower. Reports suggest that public demand is higher than in the past and currently higher in urban than in rural areas. Young, newly trained dentists tend to hire one or more dental hygienists each. More people (about one third of the U.S. population) are covered by dental insurance than in the past. The poor reportedly have increasing access to dental care through state public health departments. Dental hygienists work more than in the past in public health preventive programs. Dental hygiene is preventive dentistry, an apparent growing preference among Americans (e.g., undergoing regular cleaning and flouride rinses rather than costly drilling and filling).

Florida

In 1987, Florida had 4,276 active licensed dental hygienists, according to the Department of Professional Regulation. Not all licensees, however, reside or practice in Florida. In June 1988 the Florida Dental Hygienists' Association (FDHA) reported a total of approximately 3,100 licensed hygienists residing in Florida. Judging from the number of hygienist licenses issued annually in the State (Table 17), a decline of 22.6 percent (from 341 to 264) in new hygienists is evident during the last five years. Some of these licenses were issued to out-of-state applicants, as Florida institutions produced approximately 200 graduates annually from dental hygiene programs during the same period (Table 20).

The Florida Occupational Information System (FLOIS) projects supply from tabulations of both program graduates and "skilled leavers" who completed program requirements but did not graduate. Data are calculated by region, each consisting of one county or contiguous counties. Data available from FLOIS in 1988 project an overall deficit of 22 dental hygienists annually statewide for the five-year period between 1990 and 1995. Annual projected openings are subtracted from potential supply, however, and some of the supply as determined through FLOIS data is composed of non-graduates who are not eligible for licensure. This would suggest that these data overestimate supply. FLOIS projections are also based on the assumption that one potential employee fills one projected opening on a full-time basis. Dental hygienists,

in reality, frequently hold one or more part-time positions rather than one full-time position. Also, FLOIS estimates do not consider turnover.

The counties contributing most to the estimated undersupply consist of Hillsborough, Broward, Manatee, Sarasota, Charlotte, Collier, Glades, Hendry, and Lee (Figure 4). The FLOIS data from the four regions composed of these counties reveal no graduates or skilled leavers in 1986-87, but projected annual unfilled openings over the next five years will range from 12 to 20 in each region. The remaining counties contributing to the undersupply are Polk, Flagler, Volusia, Brevard, Indian River, Martin, Okeechobee, and St. Lucie. Other regions in the State currently indicate an oversupply, near balance, or balance.

Reports from the Florida Dental Association indicate that dentists perceive that a dental hygiene shortage exists in many of the counties identified by the FLOIS data as having an undersupply. The FDA also recognizes some northeastern and central Florida counties as shortage areas.

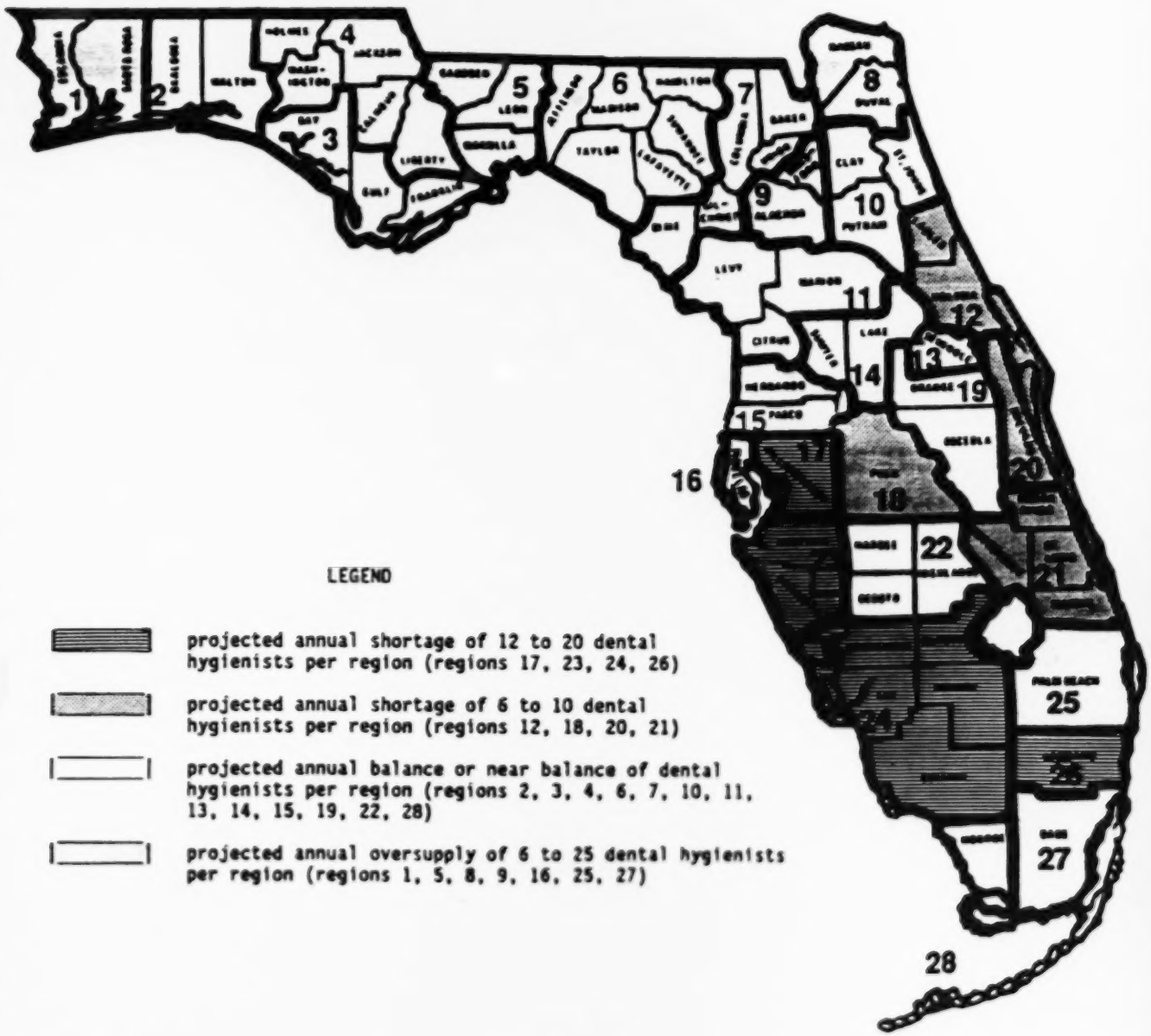
Regional shortages are partially attributed to seasonal demographic change, particularly in Florida where a winter influx of residents creates short-term demand each year. Other demographic factors, such as currently increasing in-migration and a growing elderly population with special dental care needs and a preference for a warm climate, may also contribute to the manpower situation.

A recent study of dental hygiene manpower in Georgia suggested that the reported shortages of hygienists may be at least partially attributable to the practitioner profile, the high utilization of hygienists by dentists, and the lack of professional organization (i.e., job-versus-career attitudes). A result of these phenomena may be high turnover and high demand for hygienists.

In sum, current estimates are of an overall undersupply of dental hygienists statewide stemming from regional undersupply, primarily in the western and southwestern areas, parts of the central eastern and southeastern areas, but also scattered throughout the central part of the State.

Figure 4

REGIONAL DENTAL HYGIENIST MANPOWER SUPPLY AND DEMAND PROJECTIONS
1990-1995



Source: Florida Occupational Information System, 1988.

IV. DENTAL ASSISTING

A. The Profession

Employment of dental assistants is reported by the American Dental Association to "increase the efficiency of the dentist in the delivery of oral health care." The primary function of dental assistants consists of performing tasks related to patient treatment. Depending upon state regulations, dental assistants may prepare patients for treatment, maintain a clear operating field, pass instruments and materials to the dentist, and prepare materials used in treatment. Additional responsibilities may include taking and developing X-rays, preparing setup trays and study casts, and sterilizing instruments. Patients may also receive oral hygiene instruction from assistants. Finally, office duties may include appointment and record management, billing and payment tasks, and ordering of supplies.

Earnings are reported by the ADA to be similar to those of other health care occupations requiring one year of training. The Florida Dental Association (FDA) noted in a recent study that new dental assistants in the State receive between minimum wage and about $7.00 per hour, depending on their training and on other factors such as local supply and demand. Earnings may go as high as $450 per week for those with office management responsibilities, but they may be required to work 45 to 50 hours in order to earn that amount.

Although dental assisting has traditionally been an occupation dominated by young women, the Florida Dental Assistants Association notes that this is changing. In Florida, interest in becoming a dental assistant is declining among young people and women as more visibly rewarding opportunities become available to them. Increasing numbers of women choose to become dentists while fewer choose dental assisting except as a transitional step to another profession or further education. The slight increase in minority representation among Florida's dental assistants is primarily in the south where the population is largely Hispanic. Many minority dental assistants are foreign-trained dentists who use dental assisting as entry into the dental profession in the U.S. Much of the increased male participation in the State is also among minorities and in the south.

The Florida Dental Assistants Association also perceives that, due to the transitory nature and low earnings potential of dental assisting and to its apparent low status as a profession, dental assistants do not readily organize themselves as professionals in order to achieve goals leading to higher status and improved benefits.

B. Licensure

Nationally, dental assistants are not licensed but may choose to obtain certification. Status as a Certified Dental Assistant is an acknowledgement of competence in assisting with the provision of dental care. Certification is granted after passing the Dental Assisting National Board Certification Examination which is administered by the Dental Assisting National Board, Incorporated. Eligibility to take the examination is generally based on completion of an accredited dental assisting program. Applicants who have

received on-the-job training or who have graduated from a non-accredited program may be determined eligible under certain circumstances.

The Florida Board of Dentistry does not distinguish between certified and non-certified dental assistants. Persons interested in working as dental assistants may be employed without regard to previous training or experience in the field. A recent recommendation to register all dental assistants was not approved by the Board. The State does, however, regulate practice by dental assistants in the areas of expanded duties and radiography.

Expanded duties (e.g., cementing temporary crowns and bridges with temporary cement) may be practiced only after successful completion of expanded duties coursework in Florida in either an ADA-accredited school or a Board-approved expanded duties program. No out-of-state endorsement for expanded duties is available. The State does not issue certification in this area. Rather, dental assistants who have fulfilled the coursework requirement must post the relevant institutional credentials at their place of employment.

Dental assistants who wish to perform radiography must meet one of the following requirements: (1) graduation from an ADA-accredited dental assisting school in the U.S. or a Board-approved dental assisting program in Florida or (2) possession of a Florida Radiography Certificate. The Certificate may be obtained upon submission of (1) evidence of successful completion of a radiography course in Florida at an ADA-accredited or Board-approved school and (2) a letter from a Florida licensed dentist confirming that the applicant completed six months of continuous experience assisting in the exposing of radiographs under direct supervision of the dentist. The experience requirement was reduced from one year to six months in 1988.

C. Employment Sites

A 1988 report of the U.S. Department of Health and Human Services revealed that 87.8 percent of dentists employed at least one dental assistant either full- or part-time. This represented an increase of 17.1 percent since 1955 but an increase of less than 1.0 percent since 1981. Assistants may be employed in a variety of settings in addition to solo, group, and specialty practices, in all of which dentists frequently employ two or three assistants. Other sites include public health practice in clinics and schools, hospitals, dental school clinics, business and industry, and in educational and training institutions where dental assistants may be involved in teaching future assistants.

Employment settings in Florida are similar to those nationally. Assistants work for independent dentists, in public health clinics, or with privately owned businesses. The latter may be, for example, insurance companies or a relatively new phenomenon, storefront walk-in dental centers, frequently found in shopping malls or other commercial areas. A recent study suggests that the number of new dental offices opening annually in Florida may surpass national averages, thus creating more new openings for auxiliary personnel. Employment characteristics of Florida dental assistants have not been collected and compiled. As assistants are not licensed or registered through a State agency, the lack of such information as employment site, salary, educational

preparation, and scheduling creates a major gap in developing a profile of dental assistants in Florida.

D. Education

National Programs

Throughout the United States, training of dental assistants is provided on the job or through an academic program at a vocational or technical school, community college, or university. Most academic programs require nine months to one year of coursework. Upon successful completion, graduates usually receive a certificate or diploma. A few programs are longer than one year and lead to an associate degree. On-the-job training does not necessarily prepare assistants for the certification examination or enhance opportunities for professional advancement or salary increases.

Program content and type of credential granted vary among institutions and states. Some programs teach only minimal academic foundations for practice, focusing on clinical technique, while others include a broader academic base as well as practical methods and techniques. Between 1983 and 1985 the number of dental assistant programs in the U.S. accredited by the Commission on Dental Accreditation increased from 281 to 290, but by 1987 several programs had closed, leaving a total of 275. The ADA does not tabulate the number of institutions offering each type of program (diploma, certificate, and associate degree).

Florida Programs

In Florida, dental assistant preparation is not standardized statewide. Dental assisting programs in the state are approximately one year in length, including clinical hours which supplement academic credit hours. Preparation for the occupation is available in both the vocational and community college systems (Appendix B). Sixteen public programs listed enrollments in 1986-87. The number of dental assisting programs in the Division of Vocational, Adult and Community Education which reported student data during the three academic years preceding 1987-88 ranged from six to eight (Table 23). These programs provide in-service training to those already in the field and/or pre-service preparation for those not yet working as dental assistants. Between 1984-85 and 1986-87, there was a decline in the number offering both types of programs and in the number of pre-service programs. No vocational centers offered in-service training alone in 1984-85, while three offered pre-service training and five offered both. The situation nearly reversed the following year and changed only slightly in 1986-87, so that by the third year of this period, four centers offered only in-service training, one offered pre-service, and two had both programs.

TABLE 23

ENROLLMENTS IN FLORIDA DENTAL ASSISTING PROGRAMS
BY PROGRAM TYPE
1984-85 TO 1986-87

	VOCATIONAL CENTERS				ENROLLMENTS				
Year	Total	Pre-Service	In-Service	Both	Total	Pre-Service Number	Pre-Service Percent	In-Service Number	In-Service Percent
1984-85	8	3	0	5	613	317	51.7	296	48.3
1985-86	6	1	4	1	442	90	20.4	352	79.6
1986-87	7	1	4	2	727	121	16.6	606	83.4

NOTE: Pre-service programs, referred to as "Postsecondary Adult," train those not yet in the field to be dental assistants. In service or "supplemental" programs provide additional training for those already working as dental assistants.

SOURCE: Division of Vocational, Adult and Community Education, 1988.

Of the nine community colleges preparing dental assistants prior to July 1988, seven offered the choice of a technical certificate program or an associate of science degree program. Graduates of either program were trained for the same level of entry into the occupation. In response to legislative action in 1984, all dental assisting programs in Florida were leveled to vocational programs to eliminate duplication. Effective July 1989, no academic (non-vocational) credit will be awarded for dental assisting studies.

Programs approved by the Board of Dentistry to educate dentists, dental hygienists, or dental assistants are automatically approved to offer expanded functions coursework and radiography coursework (Appendix C). In addition, the expanded functions and radiography courses offered by three proprietary schools in the State are acceptable to the Board of Dentistry. Courses in expanded functions vary widely statewide, ranging from two days to six weeks. The course content, procedures, and duration of courses preparing dental assistants for Radiography Certification (including their examinations) are not specified by the State, and programs differ greatly by institution.

National Enrollments and Completions

First-year enrollments in dental assisting programs nationally declined nearly 20.2 percent from a peak of 8,386 in 1979 to 6,242 in 1987. In addition, total enrollments decreased 22.0 percent during the four-year period between 1984-85 and 1987-88 (Table 24). A 23.7 percent decline in completions was noted during the same period from 6,105 in 1984-85 to 4,660 in 1987-88. This decline is particularly evident in associate degree programs.

TABLE 24

ENROLLMENTS AND COMPLETIONS IN DENTAL ASSISTING PROGRAMS IN THE U.S. 1984-85 TO 1987-88

	ENROLLMENTS		COMPLETIONS		
Year	Total	First Year	Total	Certificate/Diploma	Associate Degree
1984-85	8,370	7,822	6,105	5,582	523
1985-86	7,839	7,394	5,855	5,367	488
1986-87	7,145	6,776	5,282	5,015	267
1987-88	6,527	6,242	4,660	4,428	232

SOURCE: American Dental Association, 1988.

Florida Enrollments and Completions

Total enrollments in all dental assisting programs in Florida public institutions declined steadily between 1984-85 and 1986-87, from 702 to 413, a 41.2 percent drop (Table 25). The large difference between the first two years may be attributable to the shift in type of students enrolled in vocational centers, as noted above, from mostly potential dental assistants to predominantly those already employed as assistants. Analysis of the breakdown between community college and vocational center enrollments reveals that the community colleges' share of the total increased notably during this three-year period, from 54.8 to 70.7 percent.

In the State's community college assisting programs, total enrollments dropped each year (Table 26). Certificate programs garnered an increasing share of total enrollments during the three years, from 70.7 to 74.3 percent. In the vocational system total enrollments increased from 613 in 1984-85 to 727 in 1986-87 after dropping to 442 in 1985-86 (Table 23). Nonetheless, interest in preparatory dental assisting education declined as enrollees wishing to become dental assistants composed only 16.6 percent of total enrollments by 1986-87 compared to 51.7 percent in 1984-85. By 1986-87, the majority of dental assisting students in vocational institutions were dental assistants seeking supplemental training.

Total completions in the State also decreased over the three-year period, by nearly one third, from 243 to 163 (Table 25). The decline occurred predominantly in vocational center programs where graduates were only 14.7 percent of the total in 1986-87, dropping from 42 percent of all Florida graduates in 1984-85. Practicing dental assistants are not counted among vocational center graduates as they do not contribute to the overall supply. Community colleges produced slightly increasing numbers of graduates from technical certificate programs, from 124 to 130, and only half as many graduates from associate degree programs in 1986-87 as in 1984-85 (Table 26). The overall effect was a slight decrease in dental assisting graduates from community colleges, from 141 to 139.

TABLE 25

TOTAL ENROLLMENTS AND COMPLETIONS IN FLORIDA PUBLIC
DENTAL ASSISTING PROGRAMS
1984-85 TO 1986-87

	ENROLLMENTS					COMPLETIONS				
		State Board of Community Colleges		Div. Voc., Adult & Commu. Educ.			State Board of Community Colleges		Div. Voc., Adult & Commu. Educ.	
Year	Total	Number	Percent	Number	Percent	Total	Number	Percent	Number	Percent
1984-85	702	385	54.8	317	45.2	243	141	58.0	102	42.0
1985-86	416	326	78.4	90	21.6	139	136	97.8	3	2.2
1986-87	413	292	70.7	121	29.3	163	139	85.3	24	14.7

Note: DVACE enrollments and completions include only pre-service programs.

SOURCE: State Board of Community Colleges, 1988 and Division of Vocational, Adult and Community Education, 1988.

TABLE 26

TOTAL ENROLLMENTS AND COMPLETIONS IN FLORIDA
COMMUNITY COLLEGE DENTAL ASSISTING PROGRAMS BY PROGRAM TYPE
1984-85 TO 1986-87

	ENROLLMENTS					COMPLETIONS				
		Technical Certificate		Associate of Science Degree			Technical Certificate		Associate of Science Degree	
Year	Total	Number	Percent	Number	Percent	Total	Number	Percent	Number	Percent
1984-85	385	272	70.7	113	29.4	141	124	87.9	17	12.1
1985-86	326	233	71.5	93	28.5	136	124	91.2	12	8.8
1986-87	292	217	74.3	75	25.7	139	130	93.5	9	6.5

SOURCE: State Board of Community Colleges, 1988.

Minority Participation

No national data are currently available on minority participation in dental assisting programs. In Florida, the percentages of males and Hispanics enrolled steadily increased between 1984-85 and 1986-87 (Table 27). Male enrollments jumped from 9 to 71 during the three years. Hispanics more than doubled in proportion over the three-year period, although in numbers they increased by less than 50 percent. Black enrollments dropped numerically from

72 to 43 during this period, but their proportion remained relatively stable, hovering around ten percent. While the number of male graduates also increased, from 3 to 16, the representation of Hispanic and black graduates fluctuated (Table 28).

TABLE 27

ENROLLMENTS IN FLORIDA PUBLIC DENTAL ASSISTING PROGRAMS
BY GENDER AND RACE/ETHNICITY
1984-85 TO 1986-87

Year	Total	MALE		FEMALE		WHITE		BLACK		HISPANIC		OTHER	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1984-85	702	9	1.3	693	98.7	584	83.2	72	10.3	38	5.4	8	1.1
1985-86	416	57	13.7	359	86.3	323	77.6	40	9.6	47	11.3	6	1.4
1986-87	413	71	17.2	342	82.8	303	73.4	43	10.4	56	13.6	11	2.7

SOURCE: State Board of Community Colleges, 1988 and Division of Vocational, Adult and Community Education, 1988.

TABLE 28

COMPLETIONS IN PUBLIC DENTAL ASSISTING PROGRAMS
IN FLORIDA BY GENDER AND RACE/ETHNICITY
1984-85 TO 1986-87

Year	Total	MALE		FEMALE		WHITE		BLACK		HISPANIC		OTHER	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1984-85	243	3	1.2	240	98.8	207	85.2	19	7.8	15	6.2	2	0.8
1985-86	139	2	1.4	137	98.6	124	89.2	7	5.0	5	3.6	3	2.2
1986-87	163	16	9.8	147	90.2	134	82.2	14	8.6	15	9.2	0	0.0

SOURCE: State Board of Community Colleges, 1988 and Division of Vocational, Adult and Community Education, 1988.

E. Manpower

Supply and demand factors determine a variety of consequences related to dental services, among them employment levels of dental assistants. However, manpower data regarding dental assistants are nearly non-existent. In addition to figures provided by the U.S. Department of Health and Human Services, projections derived from surveys of dental practice are reported by the American Dental Association (ADA) and the Florida Dental Association (FDA).

In its 1988 report, the U.S. Department of Health and Human Services estimated that the number of dental assistants employed in 1986 was 174,900, producing a ratio of 1.22 active assistants per active dentist. The ADA states that dental assistants are in demand because "the average dentist usually employs two or three assistants," resulting in an "excellent job outlook." A 1987 survey of dental practice personnel by the ADA revealed that the average number of dental assistants employed by independent practitioners was 1.28, slightly higher than the U.S. Department of Health and Human Services estimate.

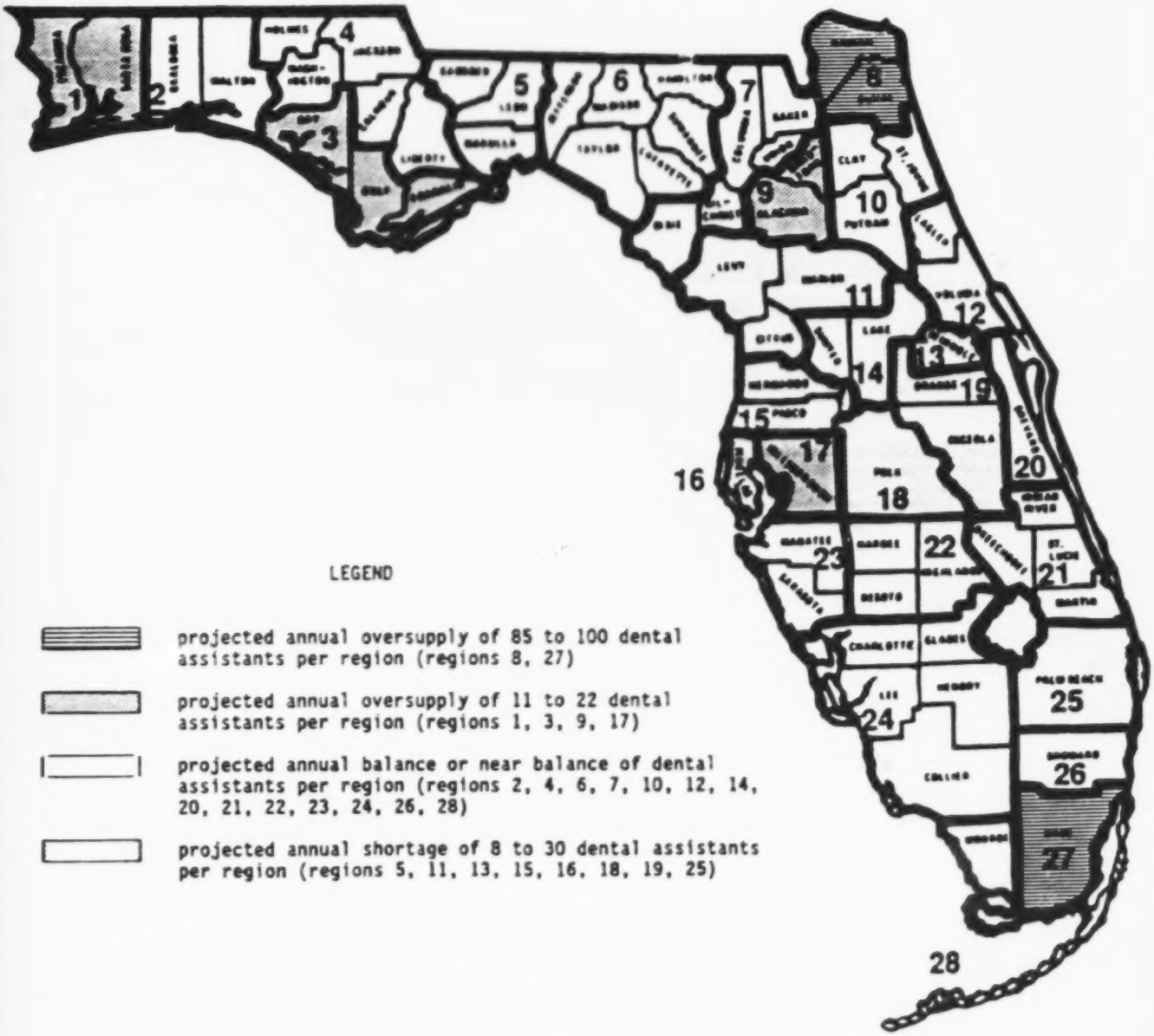
The ADA further notes that continuing enrollment and completion decreases erode potential supply of dental assistants, contributing to a growing manpower shortage. In an effort to encourage dentists to offer potential dental assistant employees incentives such as salary increases and benefits, the ADA has begun disseminating recruitment and retention literature to dentists.

In Florida, the FDA projects from recent survey data that independent dentists employ approximately 7,997 dental assistants. The public sector is estimated to utilize at least 300 more. The Department of Professional Regulation does not collect data on the number of active dental assistants.

Data available from the Florida Occupational Information System (FLOIS) provide for limited analysis of dental assisting manpower. Supply estimates are based on vocational program completions plus leavers with marketable skills. Private school data are included. Demand estimates are "average annual openings" based on projected growth and labor force separations, not including separations, from 1990 to 1995. No account is made for migration or unusual current events. Current data project a statewide oversupply. Nevertheless the data reveal that the oversupply is concentrated in specific geographic regions (Figure 5). The northeast counties of Nassau, Duval, Alachua, and Bradford, and Dade County in the south, account for nearly all of the statewide estimated oversupply (205 assistants). Somewhat oversupplied areas are Hillsborough in the west central part of the State, and Escambia, Santa Rosa, Bay, Gulf, and Franklin in the northwest (39 assistants).

Figure 5

REGIONAL DENTAL ASSISTANT MANPOWER SUPPLY AND DEMAND PROJECTIONS
1990-1995



LEGEND

projected annual oversupply of 85 to 100 dental assistants per region (regions 8, 27)

projected annual oversupply of 11 to 22 dental assistants per region (regions 1, 3, 9, 17)

projected annual balance or near balance of dental assistants per region (regions 2, 4, 6, 7, 10, 12, 14, 20, 21, 22, 23, 24, 26, 28)

projected annual shortage of 8 to 30 dental assistants per region (regions 5, 11, 13, 15, 16, 18, 19, 25)

Source: Florida Occupational Information System, 1988.

V. ISSUES AND RECOMMENDATIONS

A. Dental Manpower

In the early years of this decade, national and state level perceptions of dental manpower supply and demand were that supply exceeded demand, creating a surplus of dentists to serve the existing and projected dental needs of the State and the country. However, many of the factors influencing the supply of and demand for dental service have been far less stable in recent years than had been predicted for this period. Also, available manpower analyses project a continuation of current fluctuations in market variables, producing, in the long run, a relationship between supply and demand for dentists that generally was not foreseen at the beginning of this decade.

Chapter II examined both supply and demand of dentists nationally and locally. At the national level, supply generated through graduates of dental schools has been declining since 1983. Enrollment declines that began in Fall 1979 are projected to continue, resulting in further decreases in supply from this source. Consequently, while the number of dentists will increase in the future, the ratio of dentists to population will decrease.

The dental manpower picture in Florida, however, does not reflect all of the characteristics of the national scene. The supply of new dentists moving into the Florida market from the College of Dentistry at the University of Florida has remained quite stable, and the number of new licenses granted annually has declined only slightly in recent years. The in-migration of dentists to the State remains the primary source of new dentists through licensure. As a result, supply as measured through the number of licenses awarded annually remains relatively stable. On the demand side, annual population growth increases demand as does the growing cohort of elderly in the State. Nonetheless, the only manpower supply and demand projections prepared for Florida suggest a near balance in supply and demand by the early years of the 21st century.

Concern with declining enrollments in schools of dentistry prompted the American Dental Association to develop SELECT, a program to promote dentistry as a profession. In addition to recruiting for dentistry, SELECT also promotes dental hygiene and dental assisting work. SELECT was recently made available to individual states, and the Florida Dental Association is initiating activities statewide, regionally, and locally. SELECT provides an excellent opportunity for practitioners and educators to work together and promote careers in dentistry as well as in the ancillary fields. Cooperative efforts between professional organizations and educators serve not only to benefit prospective students but also to strengthen the relationship between the practitioner and the academician.

Recommendations:

1. **The size of the first-year class at the University of Florida College of Dentistry should remain at its present level. Data analyzed in the preparation of this study suggest that at this level the State will continue to have a sufficient number of dentists to serve the dental needs of its residents.**

2. **The Florida Dental Association and local dental societies should involve representatives of the College of Dentistry in SELECT a program developed by the American Dental Association to promote careers in dentistry and related fields.**

3. **In light of the dynamic variables influencing both supply and demand of dentists, the Office of Comprehensive Health Planning in the Department of Health and Rehabilitative Services should examine dental manpower in 1991 and provide updated estimates on the supply of and demand for dentists in the State by 1993.**

Available information on dental hygiene manpower suggests a shortage of hygienists, especially in selected geographic areas. The supply of new hygienists, based on the number of licenses granted from the Department of Professional Regulation, has been declining since 1986. Public testimony from practitioners and the Florida Dental Association indicates that dentists are experiencing difficulty locating dental hygienists to fill vacancies, particularly in some northeastern and central Florida counties. Data from the Florida Occupational Information System (FLOIS) support some of the reported imbalances in supply and demand.

As discussed in Chapter III, the shortage situation is a result of a variety of factors. Important elements in supply are the characteristics of existing programs, establishment of new programs to alleviate geographic maldistribution, and student interest in pursuing a career in dental hygiene.

The number of qualified applicants for the spaces available in dental hygiene programs varies across the State from less than a one-to-one ratio to four-to-one. Some programs continue to design their coursework within the traditional weekday schedule. Few offer evening or weekend classes to attract qualified individuals who cannot attend classes during the 8:00 a.m. to 4:00 p.m. timeframe. Innovative alternatives to traditional programming have been reported, especially by colleges with a ratio of one-to-one or less. The dental hygiene program at St. Petersburg Community College, for example, is exploring the possibilities of evening classes and an outreach program in a nearby county. Santa Fe Community College will soon graduate its first class of evening students in the dental hygiene program. In other efforts to reach areas unserved by a dental hygiene program, joint programs have been developed. An agreement between Pensacola Community College and Gulf Coast Community College and another between Tallahassee Community College and Chipola Junior College will allow dental hygiene students from the institutions' service areas to take part of their classes on one campus and part on the other campus. Increased flexibility in scheduling and cooperative approaches may stimulate interest in dental hygiene as a career and combat declining student interest in dental hygiene.

<u>Recommendation</u>:

4. **Dental hygiene programs should provide for flexible programming and consider such alternative approaches as expanded scheduling, off-campus programs, and cooperative programs with other community colleges.**

A second element affecting the supply of hygienists is the availability of programs. The current nine programs are geographically distributed throughout the State. The southwestern area, including the counties of Lee, Hendry, Collier, Sarasota, Charlotte, and Glades, are reportedly experiencing an undersupply of hygienists and are also not served by a dental hygiene program. Although one option is the establishment of a new dental hygiene program at an area community college, the high costs of implementing and maintaining such a program coupled with uncertainty in student demand for enrollment and seasonal fluctuations in market demand argue against this approach. Instead, dental practitioners, educators, and representatives of the State Board of Community Colleges should explore other options, such as admitting students outside of their service areas, and develop actions to increase the number of licensed dental hygienists, particularly for undersupplied areas.

Recommendation:

5. **The establishment of new dental hygiene programs to increase the number of practicing dental hygienists in shortage areas should be considered only after careful review and clear demonstration of need. High program expenses compromise other institutional priorities and lack of reliable student demand data jeopardize the future of programs implemented without very careful, thorough prior consideration.**

Finally, student interest is an essential factor in manpower supply. Professional groups for many health professions are developing recruitment projects to promote their fields much as the American Dental Association has done with SELECT. Both the Florida Dental Association and the Florida Dental Hygienists' Association support efforts to increase the supply of hygienists. Recruiting students to dental hygiene education programs and providing financial assistance are recognized by the professional and educational sectors as areas to emphasize in alleviating the shortage problem. The Commission endorses initiatives that unite dentists, dental hygienists, and educators to develop strategies to address these issues.

Recommendations:

6. **Local dental societies should collaborate with dental hygiene programs, particularly those with available program space for students, in developing strategies which will encourage and support students from dental hygiene shortage areas to pursue dental hygiene education in other areas of the State and then return to their home area to practice.**

7. **The Florida Dental Association should coordinate with the Florida Dental Hygienists' Association and dental hygiene program directors to implement SELECT activities designed to attract both traditional and nontraditional students to dental hygiene programs.**

8. **In addition to initiatives at the local level, the Florida Dental Association and the Florida Dental Hygienists' Association should provide financial assistance in the form of**

grants, loans, and scholarships to assist students through dental hygiene education.

Planning for dental education is contingent upon current information. The scarcity of appropriate, comprehensive, and recent information on dental hygienists in Florida restricts educational planning for dental hygiene programs. Nationally, the American Dental Hygienists' Association is currently involved in studies not only to define who dental hygienists are but also to better understand related factors such as job satisfaction and educational characteristics. Similar efforts should be made at the State level in Florida. The Florida Dental Association surveyed a sample of its membership in Fall 1987 on the employment of dental auxiliary personnel. Limited information was also collected on hygienists and assistants from dentists during the 1986 HRS survey of dentists. The manpower survey designed, distributed, and analyzed by the HRS Office of Comprehensive Health Planning would be an appropriate vehicle to ascertain information on Florida licensed dental hygienists. Other information could be provided by systematic follow-up surveys of graduates of the State's dental hygiene programs.

Recommendations:

9. **The Office of Comprehensive Health Planning in the Department of Health and Rehabilitative Services should survey dental hygienists during the 1989 licensure renewal period. In addition to demographic and practice data, information should be collected on job satisfaction and educational plans. The Florida Dental Hygienists' Association and the Florida Dental Association should be consulted in the preparation of the questionnaire instrument.**

10. **Information from community college follow-up studies of dental hygiene program graduates should be made available to interested State agencies as part of data gathering on dental hygiene personnel.**

The manpower issue for dental assistants is difficult to describe due to the paucity of data and the variety of entry-level training available. First, little information is collected on assistants since they are not licensed by the Department of Professional Regulation and participation in the professional association for dental assistants at either the state or national level is not strong. Second, assistants are employed after training at the certificate or diploma level from a vocational/technical program in a public community college, vocational/technical center, or proprietary school, or without postsecondary education in dental assisting. The proportion of positions filled by individuals trained on the job versus those with some postsecondary education is not known. Finally, dentists frequently employ more than one assistant, so estimating demand based on the number of active licensed dentists is less than adequate.

Fifteen public institutions and one proprietary school are currently accredited by the Commission on Dental Accreditation to teach dental assisting. In addition, there are a number of unaccredited programs housed in proprietary schools. The dental assisting programs are geographically

distributed throughout the State, and program access has not been identified as a problem during this study. As noted in Chapter IV, enrollments in public sector programs have declined steadily in recent years. Experimental four-month educational programs are being developed in the State to attract students to dental assisting work.

Recommendation:

11. The current number of formal, one-year dental assisting programs appears to be sufficient to meet the needs of the State for these dental personnel.

B. Curricula

The Commission's 1983 report on dental education in Florida examined the dental hygiene curriculum in the State's programs and found great differences in curricular length, leading to the following Commission recommendation:

> The disparity in the number of credit hours required for graduation from dental hygiene programs should be reviewed by the State Board of Community Colleges, particularly in light of concern over the length of the curriculum. Greater consistency statewide should be required. Systemwide policy should be developed for the conversion of clinical hours into credit hours.

Wide variation in the length of hygiene programs remains a problem. Most of the State's programs require two or two and one-half academic years to complete; the number of total credit hours required also varies across programs.

Recommendation:

12. The State Board of Community Colleges should address curricular length as an issue in its statewide review of dental hygiene programs.

The Florida Dental Association has proposed that the accredited dental hygiene programs in Florida reduce the number of hours necessary to graduate. The Association further requested that the Department of Education insure that each dental hygiene program maintain a two-year timetable for graduation. Although the typical hygiene program in Florida and other states requires somewhat longer than two years to complete, the general education component is central to an associate degree award and is recommended by the Southern Association of Colleges and Schools. The Commission does not endorse elimination of either general education or dental hygiene courses in order to accommodate this program into a two-year period. Preliminary recommendations from the State Board of Community Colleges and the Division of Vocational, Adult and Community Education also support current curricular scope and depth.

Recommendation:

13. Since dental hygiene study culminates in an associate of science degree award, these programs should continue to meet general education requirements for an associate degree.

Dental assistants are not licensed by the State to practice. However, assistants who seek national certification are usually required to have completed an accredited dental assisting program. The specialized accrediting body, the Commission on Dental Accreditation of the American Dental Association, requires a minimum program length of one academic year and full-time study along with a specified amount of general education coursework.

In preliminary information from the 1988 statewide review of dental assisting programs, the State Board of Community Colleges and the Division of Vocational, Adult, and Community Education concluded that the Board of Dentistry should require dental assisting programs to meet the standards established by the Commission on Dental Accreditation, including the provision for general education set forth by the American Dental Association. The Commission concurs with this recommendation as a means of standardizing dental assisting education and providing quality graduates. In addition, the core committee designated to develop guidelines for criteria to be used in assigning program levels to postsecondary vocational education programs determined that dental assisting should be offered at the certificate level rather than the associate degree level. Given the recommendation of the core committee, dental assisting programs should not be encouraged to institute curricular modifications that would detract from basic dental assisting education by introducing unnecessary coursework in order to grant an associate degree in dental assisting. The Commission agrees with arguments forwarded by practitioners and professional associations that graduates of newly created associate of science degree programs in dental assisting technology would be overqualified as assistants and underqualified as hygienists and therefore not the type of employee needed by dentists.

Recommendations:

14. **The Board of Dentistry should develop criteria to approve both on-the-job training and formal dental assisting programs. Compliance with these criteria should be required by the Board of Dentistry for approval of all dental assisting programs.**

15. **Consistent with Section 240.355, Florida Statutes, dental assisting programs should be offered at the lowest level possible commensurate with sound professional practice. The Department of Education Core Committee for Program Leveling has determined that dental assisting programs should be offered at the postsecondary vocational education level with a certificate award.**

C. Licensure and Certification

The State's laws governing licensure of dental hygienists require all hygienists trained out of state to successfully pass the Florida licensure examination, both the written and the clinical sections. There is no provision for licensure by permitting or endorsement, and it was suggested by both dentists and hygienists during the preparation of this report that current State requirements are detrimental to improving the manpower supply through migration of hygienists from other states. Testimony received during public hearings indicates that the Florida examinations are comparable to

those in many other states. While the written portion of the examination covering the laws and rules of Florida is an area in which all practitioners in the State should demonstrate competence, it is not clear why the clinical portion of the examination should be required of in-migrating hygienists unless a comparison of the Florida clinical examination with other individual state or regional clinical examinations reveals an unacceptable level of difference. As the statutes now specify that all candidates for licensure must successfully complete both examinations, any modifications must be made at the statutory level. However, authorization of temporary permits to practice in Florida falls within the purview of the Board of Dentistry.

Recommendation:

16. The Department of Professional Regulation and the Board of Dentistry should provide temporary permitting for a maximum period of thirteen months for dental hygienists holding valid licenses from other states.

As discussed in Chapter IV, the State regulates only those dental assistants who perform expanded duties and radiography. To perform expanded duties, assistants must have successfully completed specified coursework in an ADA-accredited school or a Board-approved expanded duties program. However, a certificate is not awarded by the Department of Professional Regulation, and there is little standardization of coursework for expanded duties. Reports on course length vary from as little as two days to up to six weeks. Although requirements are somewhat more formalized for radiography, such elements as course content, procedures, and duration are not specified and programs vary greatly by institution. For certification in radiography, the Board of Dentistry requires applicants to have passed a radiography examination offered by an ADA-accredited or Board-approved program and to have accumulated six months of continuous experience assisting in exposing radiographs. Providing quality dental health care is a primary consideration, and the Commission supports measures to maintain and, when possible, improve the quality of such service. The issues of limited standardization and quality control in the areas of expanded functions duties and radiography need to be addressed.

Recommendations:

17. Dental assistants who practice expanded duties should be certified by the Board of Dentistry. In order to promote standardization and quality, certification requirements should include successful completion of a statewide standardized expanded duties examination approved by the Board of Dentistry.

18. Dental assistants who practice dental radiography should be certified by the Board of Dentistry. Certification requirements should include successful completion of a statewide standardized dental radiography examination approved by the Board of Dentistry.

D. Articulation

As dental hygiene study in Florida culminates in an associate of science degree award, it is considered a terminal degree program designed to prepare the student to enter the workforce upon program completion. Students considering this program are sometimes cautioned through college catalogs that transferring to continue with a baccalaureate degree would entail additional requirements. Nonetheless, many students holding a degree in dental hygiene elect to pursue a bachelor's degree, often in another field. This has become even more common in recent years as the career interests of women have changed and women have found a greater variety of professional fields open to them. As Florida does not have a bachelor's degree program in dental hygiene, students holding an AS degree in this area do not have a direct career ladder available. Those wishing to continue working toward a bachelor's degree in dental hygiene must do so in a program out of state. There is no information on Florida hygienists' plans to continue their educational preparation and little on the current level and type of academic preparation practicing hygienists have. Such information would be useful in analyzing the impact that leavers will have on the profession. Recommendation 9 above calling on the Department of Health and Rehabilitative Services, Office of Comprehensive Health Planning, to survey licensed dental hygienists should provide these data.

Dental assisting programs should provide a direct career ladder toward dental hygiene for those assistants wishing to move upward in their work. While some local articulation agreements or understandings exist between dental assisting and dental hygiene programs to enhance the smooth transfer from one level to the other, the articulation process needs to be examined statewide and strategies delineated to assure that the necessary bridges between programs are strong and accessible to students. This issue has also been considered by the State Board of Community Colleges and the Division of Vocational, Adult and Community Education during their program review process. In a preliminary report, these agencies suggested that the Department of Education's Articulation Coordinating Committee establish a task force to develop mechanisms to expedite articulation for graduates of dental assisting and dental hygiene programs, or assign the task to the appropriate existing committee. The Commission also believes that articulation for dental auxiliaries is an issue that needs to be addressed at the State level.

Recommendation:

19. The Articulation Coordinating Committee within the Department of Education should develop guidelines for articulation between dental assisting programs and associate degree dental hygiene programs.

E. Minority Participation

The representation of gender and racial/ethnic minority groups in dentistry programs nationally is characteristic of similar trends in some other health professions. More women and Hispanics enroll and graduate than in previous years, but fewer blacks are found in first-year classes than in recent years. At the University of Florida, College of Dentistry, trends in increased

enrollments of women and Hispanics are evident. While black enrollment has almost doubled in the last eight years, blacks still comprised only six percent of total enrollments in 1988. Hispanics, on the other hand, accounted for 19 percent of total enrollments. Much of the success with gender and racial/ethnic minorities reflects the College's active recruiting efforts, and the College is to be commended for its initiatives to stimulate minority enrollments and graduations. Additional attention, nonetheless, must be given to recruiting black students to dentistry.

Recommendation:

20. **The College of Dentistry at the University of Florida should focus recruitment efforts on increasing the representation of blacks in the entering classes. If possible, SELECT activities should be coordinated to target black youth.**

The numbers of males, blacks, and Hispanics entering and completing Florida dental hygiene programs were stable during the mid-years of this decade. Enrollments and graduations of males have been extremely low, with only one or two graduating annually. Black enrollments and graduations have accounted for about two percent of the total each year. Hispanics were represented to a much greater degree, with enrollments and graduations averaging approximately ten percent of the totals. Except for Hispanics, minority groups are hardly represented in dental hygiene programs. As a result of their low participation in programs, few sit for the licensure examination. In recent years, two males, on average, have passed the licensure examination, three blacks have passed, and 15 Hispanics have passed. Males and blacks are clearly underrepresented in dental hygiene. Considering the downward trends overall in dental hygiene program enrollments, turning this situation around and attracting large numbers of minorities, particularly males and blacks, will not be done easily or quickly.

Recommendation:

21. **The Florida Dental Association, local dental societies, and dental hygiene program directors should establish minority recruitment as a priority concern and coordinate their efforts to achieve the greatest impact. Specific strategies should be developed to increase enrollments, graduations, and licensure examination pass rates of gender and racial/ethnic minorities in dental hygiene.**

Data on minority representation in Florida's public dental assisting programs indicate that participation of males and blacks is much higher than in hygiene programs while Hispanic representation is somewhat lower. Dental assisting may be more attractive as a career option than is dental hygiene because of less stringent admissions and licensure requirements. Nonetheless, dental assisting programs may be a viable resource to recruit gender and racial/ethnic minorities into the field of dental hygiene. This also further supports the importance of providing complete articulation mechanisms for assistants to advance into dental hygiene.

Recommendation:

22. **Working together, dental hygiene and dental assisting programs should increase efforts to enhance the articulation opportunities of gender and racial/ethnic minorities.**

F. Conclusion

In recent years, the dental profession, as with many other health professions, has experienced significant social and economic forces leading educators to re-evaluate their educational programs and align them with national and local needs. In Florida, existing dental education programs continue to provide adequate opportunities to meet the State's needs for these health personnel. A College of Dentistry, nine dental hygiene programs, and sixteen approved, formal dental assisting programs currently serve Florida citizens pursuing dental education.

The Commission's study found that few changes need be implemented in the educational programs. Other issues, however, emerged during the study that should be addressed. Many of the issues and subsequent recommendations require cooperative efforts among educational institutions, dental professional organizations, and State agencies. In particular, Commission concerns focus on licensure and certification of auxiliaries, articulation processes, and gender and racial/ethnic representation in all dental education areas.

APPENDICES

APPENDIX A

FLORIDA DENTAL HYGIENE PROGRAMS ACCREDITED BY THE COMMISSION ON DENTAL ACCREDITATION AND STATE-APPROVED 1988

Florida Community College at Jacksonville

Indian River Community College *

Miami-Dade Community College

Palm Beach Community College

Pensacola Junior College

Santa Fe Community College

St. Petersburg Junior College

Tallahassee Community College

Valencia Community College *

*Conditionally approved by the Commission.

SOURCE: American Dental Association, 1988 and Florida Department of Professional Regulation, 1988.

APPENDIX B

INSTITUTIONS ACCREDITED BY THE COMMISSION ON DENTAL ACCREDITATION, AMERICAN DENTAL ASSOCIATION, TO TEACH DENTAL ASSISTING 1988

Institution	Public/Private
Brevard Community College	Public
Broward Community College	Public
Charlotte Vocational-Technical Center	Public
Daytona Beach Community College	Public
Florida Community College at Jacksonville	Public
Gulf Coast Community College	Public
Indian River Community College	Public
Lindsey Hopkins Technical Education Center	Public
Manatee Area Vocational-Technical Center *	Public
Orlando Vocational-Technical Center	Public
Palm Beach Community College	Public
Pensacola Junior College	Public
Robert Morgan Vocational-Technical Institute	Public
Santa Fe Community College	Public
Southern College	Private
St. Petersburg Vocational-Technical Institute	Public

*Conditionally approved by the Commission.

SOURCE: American Dental Association, 1988 and Florida Department of Professional Regulation, 1988.

APPENDIX C

INSTITUTIONS APPROVED BY THE FLORIDA BOARD OF DENTISTRY TO OFFER EXPANDED FUNCTIONS AND RADIOGRAPHY COURSES 1988

Institution	Public/Private
Advantage Career Training	Private
Brevard Community College	Public
Broward Community College	Public
Charlotte Vocational-Technical Center	Public
Daytona Beach Community College	Public
Florida College of Medical and Dental Assisting	Private
Florida Community College at Jacksonville	Public
Gulf Coast Community College	Public
Indian River Community College	Public
Keiser School	Private
Lindsey Hopkins Technical Education Center	Public
Manatee Area Vocational-Technical Center *	Public
Miami-Dade Community College	Public
Orlando Vocational-Technical Center	Public
Palm Beach Community College	Public
Pasco-Hernando Community College	Public
Pensacola Junior College	Public
Robert Morgan Vocational-Technical Institute	Public
Santa Fe Community College	Public
Southern College	Private
St. Petersburg Vocational-Technical Institute	Public
Tallahassee Community College	Public
University of Florida	Public
Valencia Community College	Public

*Conditionally approved

SOURCE: American Dental Association, 1988 and Florida Department of Professional Regulation, 1988.

State of Florida
Department of Education
Tallahassee, Florida
Betty Castor, Commissioner
Affirmative action/equal opportunity employer